

恩智浦微控制器及微處理器於工業及消費性 互聯網專注的領域和第三方合作夥伴策略

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SECURE CONNECTIONS
FOR A SMARTER WORLD

PUBLIC

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EDGE PROCESSING – A DISTRIBUTED INTELLIGENCE PYRAMID

MILLIONS

Cloud
Data Centers

CLOUD & SERVICE PROVIDERS



NETWORK



Building Gateways



Local Edge Compute



Base Station & Access Points

10'S TO 100'S MILLIONS

Network Edge
Network Computing

BILLIONS

Application Edge
Industrial & IoT

IOT



Home Gateway



Home Control



Appliances



POS



Wearables



Smart Home Devices



INDUSTRIAL



Factory Automation



Building & Energy



Transportation & Mobility



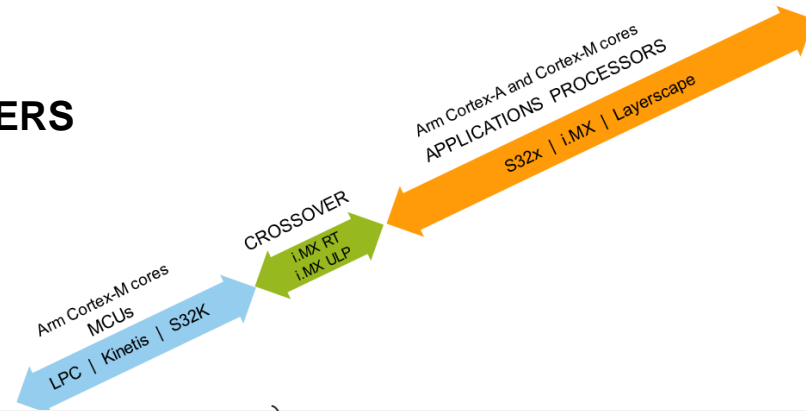
Healthcare



Ind. HMI



Machine Vision

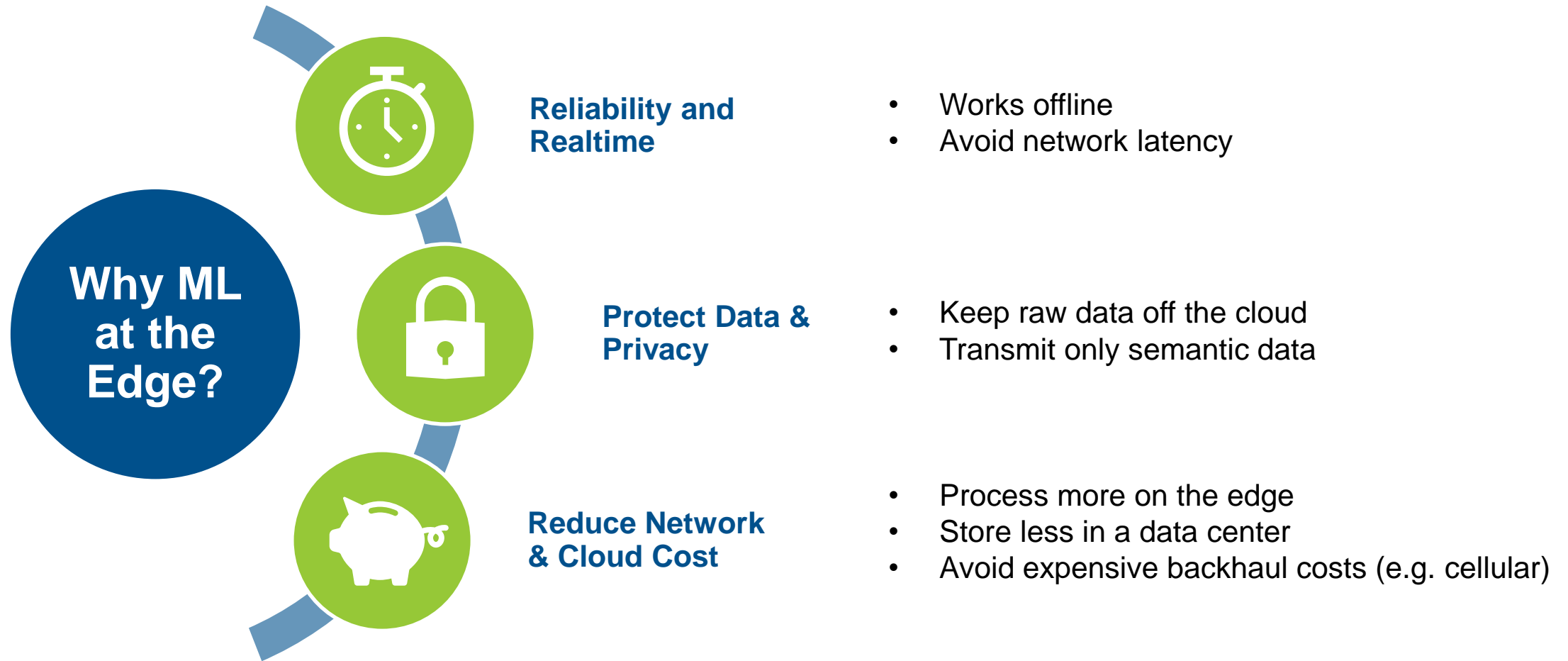


EDGEVerse

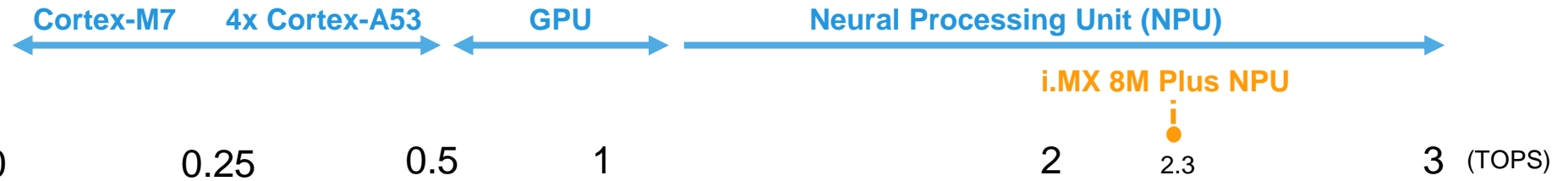






Edge Processing
served market

Why Edge Processing?



MACHINE LEARNING USE CASES AND ACCELERATORS



	Computer Vision	Face and still image recognition, person detection (images)	Multi-face recognition, object detection (video)	Live video face and object recognition	Multi-object surveillance (people, cars, animals)
	Speech Analysis	Wake word, 10 Word speech, speaker recognition	Automatic speech recognition (basic command phrases)	40,000 words vocabulary, multiple speaker recognition	Speech accents interpretation
	Video Processing	Super resolution upscaling, denoising	Live video upscaling, denoising		Scene segmentation
	Sequence Analysis	Anomaly detection (environmental sensors)	Pose estimation	Gesture recognition	Complex real-time motion analysis

NXP BROAD-BASED MACHINE LEARNING SOLUTIONS & SUPPORT



eIQ MACHINE LEARNING

eIQ™ Toolkit

eIQ (edge intelligence) for edge AI/ML inference enablement

eIQ inference workflow

Inference engine technologies

Open-source (TensorFlow Lite, Arm NN, Glow, ONNX)

eIQ inference with DeepViewRT™

Support for i.MX 8 series and i.MX RT Crossover MCU

Integrated into NXP development environments

DIY

Third-party Software and Hardware

Au-Zone Technologies network development tools

Amazon SageMaker NEO and AWS

Microsoft Azure cloud services

Arcturus video applications

SensiML tools for sensor analysis

LS1043 Freeway kit and Google TPU

i.MX 8M Mini Dev Kit for Amazon® Alexa Voice Service

.... And more



AU-ZONE TECHNOLOGIES (i.MX RT1060 INSIDE)



eIQ AUTO AI

eIQ™ Auto Toolkit

Deep Learning toolkit for S32V23x processors

Optimization: Prunes, quantizes, compresses the Neural Network

Automated neural net layer deployment to optimum available compute resource

Auto Quality Inference Engine: A-SPIICE qualified inference engine

Automotive Grade

Turnkey Solutions

Face and emotion recognition - i.MX RT106F (SLN-VIZN-IOT; replaced by VIZNAS)

Secure Face and emotion recognition (launching Nov 5) - i.MX RT106F (kit – SLN-VIZNAS-IOT)

Local voice control - i.MX RT106S (SLN-LOCAL-IOT)

Alexa Voice Services - i.MX RT106A (SLN-ALEXA-IOT)

Fully Tested



SLN-VIZN-IOT



NXP Edge Computing and Security Brand Platform

EDGEVerse™ Portfolio

Signature Software	Embedded Processing					Turn-key Solutions
eIQ™ Machine Learning Immersiv3D™ Audio Framework EdgeScale™ Device Mgmt ...	Apps Processors	Crossover Processors	Microcontrollers	Connectivity	Auto	MCU-Based Solution for Alexa™ Voice Service
	i.MX Layerscape® ...	i.MX RT i.MX 7ULP ...	LPC5500 K32 L3 ...	Bluetooth® LE Wi-Fi® ...	S32 i.MX ...	65 W+ Wireless Power for 5G
						15 W Wireless Power for Auto
						...
EDGELock™ Portfolio						
EdgeLock SE Secure Element Products	EdgeLock SA Secure Authenticator Products	EdgeLock Embedded Security & Subsystems	EdgeLock 2GO IoT Service Platform			

SOFTWARE, PROFESSIONAL SUPPORT & SERVICES

Complimentary Software & Tools



Kinetis Design Studio, Software Development Kit, Pin Config, Power Estimator/Analyzer, Bootloader, RTOS, Linux & Android BSPs, Manufacturing tools...

Professional Services

Managing Skills Gaps & Engineering Capacity
Global Staffing Capability
Vested Interest in Mutual Success
Graphic, Security, Linux/Android, Cloud.



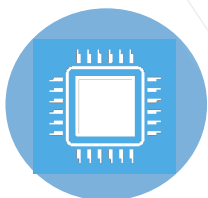
Complimentary Support

NXP Development and Reference Boards
NXP Communities
Technical Information Center
Systems Engineering (Apps) Organization
Distributor and Field Application Engineering



Hardware Services

1st Time Boot
Schematics & Layout Review
Design Simulation



Software Products / Technology

AVB, Miracast, HDCP2.x, TRLE, TEE, Home Kit, CarPlay, Android Auto, MICROEJ AUTOSAR, GPU Driver optimizations, AGL, Genivi, XBMC, HAB



Professional Support

Risk Reduction
Fast Answers
Hot Fixes

Learn more at: www.NXP.com/prosupport



NXP PARTNER PROGRAM

The **NXP partner program** comprises a global network of independent engineering companies that offer the vital tools, software, technology, engineering services and training to speed your design.

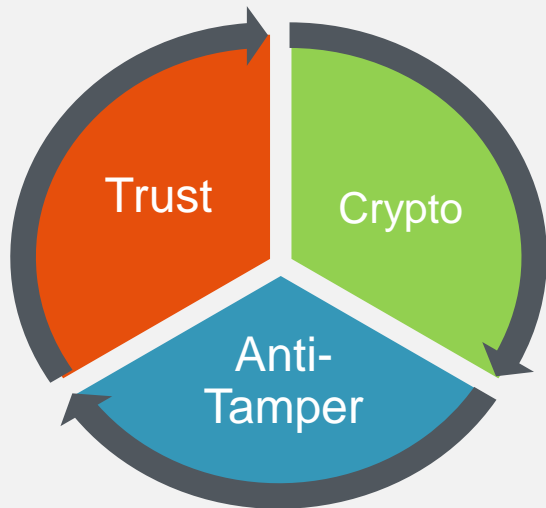
From reference boards to optimized software, the Ecosystem Member program provides a powerful and comprehensive ecosystem that partners with you in making the world a smarter, more connected place.



NXP Partner Directory:

- https://www.nxp.com/design/partner-marketplace/partner-directory:PARTNER_DIRECTORY

Product Longevity



I.MX PROCESSOR VALUES

- **Trusted Supply**
 - Product longevity: **Minimum 10 to 15 years**
 - Security and safety: Hardware acceleration, software
 - Reliability: Zero-defect methodology, ULA, low SER FIT
 - Quality: **Automotive AEC-Q100, Industrial/Consumer JEDEC**
- **Scalability for Maximum Platform Reuse**
 - Pin compatibility and software portability
 - Integration: CPU (single/dual/quad, asymmetric), GPU, IO
 - Manufacturability: 0.65 to 0.8mm pitch, fewer PCB layers
- **Support and Enablement**
 - Software: **Linux, Android, RTOS, Windows-embedded,**
 - **Industry-leading partners** and support **community**
 - **System solutions:** Voice, Video, Vision, Machine Learning, Sensors, Power Management, Connectivity

i.MX 8M FAMILY: EXTENDS ACROSS MULTIPLE APPLICATIONS

i.MX 8M family

1-4x A53

M4/M7

General Purpose Edge Processing

- High Performance Computing w/ up to 4x Cortex-A53 cores
- Up to 2+ TOPS ML acceleration
- Cortex-M co-processor for HMP
- Video Encode/Decode
- 3D GPU
- Display/Camera
- High Speed Interfaces
- High-end Audio Support
- Hardware Scalability
- Software Scalability
- Industrial and Consumer

Similar 'look and feel' to the popular i.MX 6 series, but with upgraded performance and features

i.MX 8M Plus

- 8M Plus Quad/QuadLite
- 8M Plus Dual

i.MX 8M

- 8M Quad/QuadLite
- 8M Dual

i.MX 8M Mini

- 8M Mini Quad/QuadLite
- 8M Mini Dual/DualLite
- 8M Mini Solo/SoloLite

i.MX 8M Nano

- 8M Nano Quad/QuadLite
- 8M Nano Dual/DualLite
- 8M Nano Solo/SoloLite

i.MX 8M Nano UltraLite

- 8M Nano Quad UltraLite*
- 8M Nano Dual UltraLite*
- 8M Nano Solo UltraLite*

*11x11 package not pin-compatible with 14x14 package i.MX 8M Mini or Nano

Pin-to-pin Compatible

Software Compatible



I.MX 8M FAMILY TARGET APPLICATIONS

Consumer Audio and Video Systems

- Surround sound and sound bars
- Audio/video receiver
- Immersive audio products
- Wireless or networked smart speakers
- Voice-assisted products
- Media OTT box
- Two-way video calling

Smart Home, Building and Cities

- Safety, security and surveillance system
- Smart lighting control
- Climate and building access control (e.g. video doorbell)
- Wi-Fi enabled IoT gateway
- Smart connected appliances
- Service robot, e.g. vacuum, mower, cleaner
- Elevator control panel
- Fleet analytics and driver monitoring

Industrial HMI, Machine Learning and Automation

- Barcode or image scanner
- Industrial printer
- Ruggedized HMI
- Machine visual inspection and robotic controller
- Factory automation
- Test and measurement
- Mobility and logistics
- Industrial gateways

Enterprise, Commercial and Healthcare

- IP phones
- Audio and video conferencing systems
- Digital kiosk and signage
- Vision payment systems
- Mobile patient care, e.g. infusion pump, respirator, home monitoring systems
- Blood pressure monitor
- Activity/wellness monitor
- Exercise equipment



USE CASE: GESTURE DETECTION

恩智浦邊緣處理器型號:

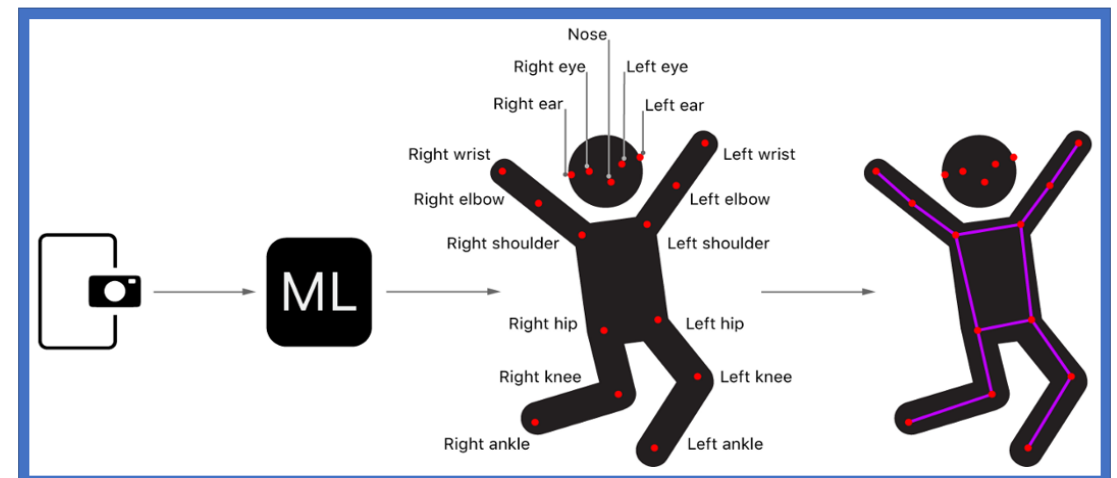
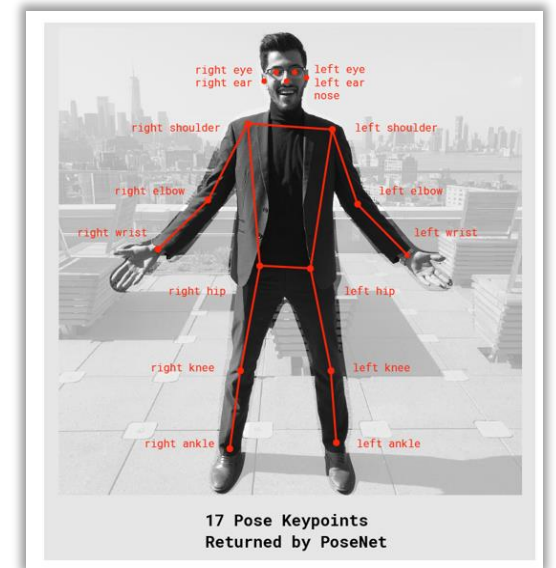
i.MX8M Plus

主要應用場景:

跌倒偵測, 運動分析回饋修正辨識肢體, 肢體互動遊戲, 肢體語言分析

技術特色說明:

恩智浦邊緣處理器i.MX8M Plus內含NPU深度學習類神經網路處理單元, 讓運算效能更快更能加速反應。「PoseNet」是Google機器學習TensorFlow的其中一個即時辨識肢體動作的視覺模型, 它可以通過檢測關鍵身體部位的位置來估計影像或者影片中的人體姿勢。例如, 該模型可以估計影像中人的手肘和/或膝蓋位置。這種姿勢估計模型不會鑑別影像中的人是誰, 只會找到關鍵身體部位的位置。



3RD PARTY EXAMPLE: AI FACE RECOGNITION

恩智浦邊緣處理器型號:

i.MX8M Plus in Android

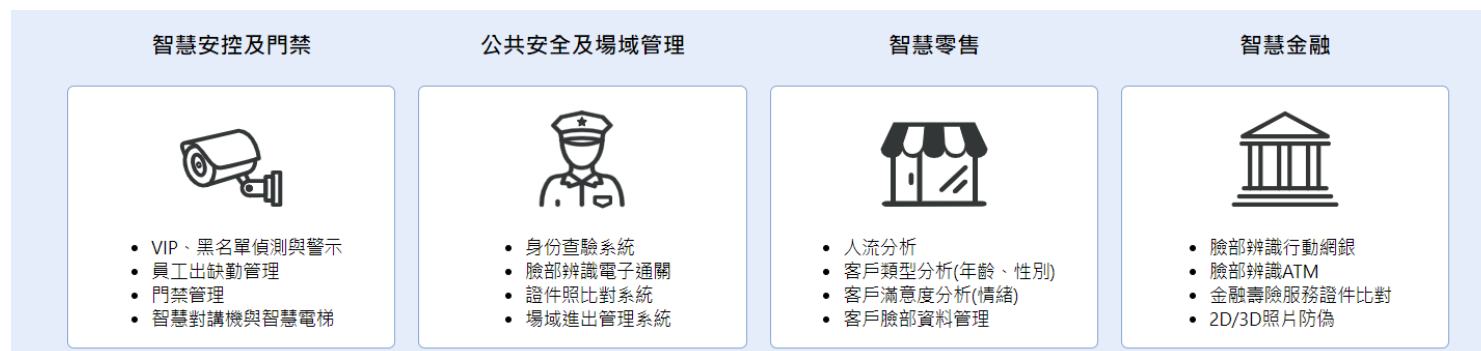
技術特色說明:

恩智浦邊緣處理器i.MX8M Plus內含NPU深度學習類神經網路處理單元，運算效能更快更能加速反應。搭配上恩智浦合作夥伴臉部辨識演算法係採用深度學習類神經網路演算法打造，在 10^{-4} 誤認率(FAR)下，可提供高達99.7%的正確辨識率(TAR, True Acceptance Rate)。卓越的辨識能力在NIST FRVT臉部辨識測試中，名列全球最精準且速度最快的辨識引擎之一

案例：口罩偵測

憑藉AI技術，臉部辨識演算法可有效辨別民眾是否戴著口罩，或口鼻露出、使用其他物品遮住口鼻等非正確配戴狀況。此功能可應用在許多依規定須配戴口罩才能進入的場所，例如商場，醫院和火車站等人流眾多的公共空間。

主要應用場景:

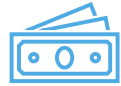




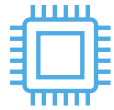
WHY WINDOW10 IOT ENTERPRISE ON I.MX FAMILY?



NXP and MSFT have a longstanding collaboration with Win IoT Core supported on i.MX 6 and i.MX 7.



Traditional Windows customers are looking for cost-effective Arm-based alternatives to x86/x64.



NXP's i.MX 8 family with its rich set of I/Os, peripherals, and powerful compute are well suited for diverse IoT industry needs.



Win 10 IoT enterprise on i.MX 8 family brings full Windows application capabilities in a small footprint delivering a low cost, low power solution ideal for compact & fan less designs .



Customers get longer-term OS support. Window10IoT enterprise LTSC release has an optional 10 Years support.



GPU accelerated Graphics to deliver smooth Windows UI experience across a broad range of compatible displays.



More IP enablement such as ML, ISP etc in the future to cover broader use cases.

WINDOWS 10 IOT ENTERPRISE BRING UP ON I.MX 8M

- **Software Prerequisites**

- The optimized NXP Win10 IoT BSPs (binaries and sources) can be obtained from nxp.com. Please follow the link below.

<https://www.nxp.com/design/software/embedded-software/i-mx-software/windows-10-iot-enterprise-for-i-mx-applications-processors:IMXWIN10IOT>

- Windows IoT Enterprise version 2004 ARM64 OS image.

<https://partner.microsoft.com/en-us/dashboard/collaborate/packages/12392>

- **NXP boards support**

- i.MX EVK: i.MX 8MQ, i.MX 8M Mini, i.MX 8M Plus, i.MX 8M Nano.

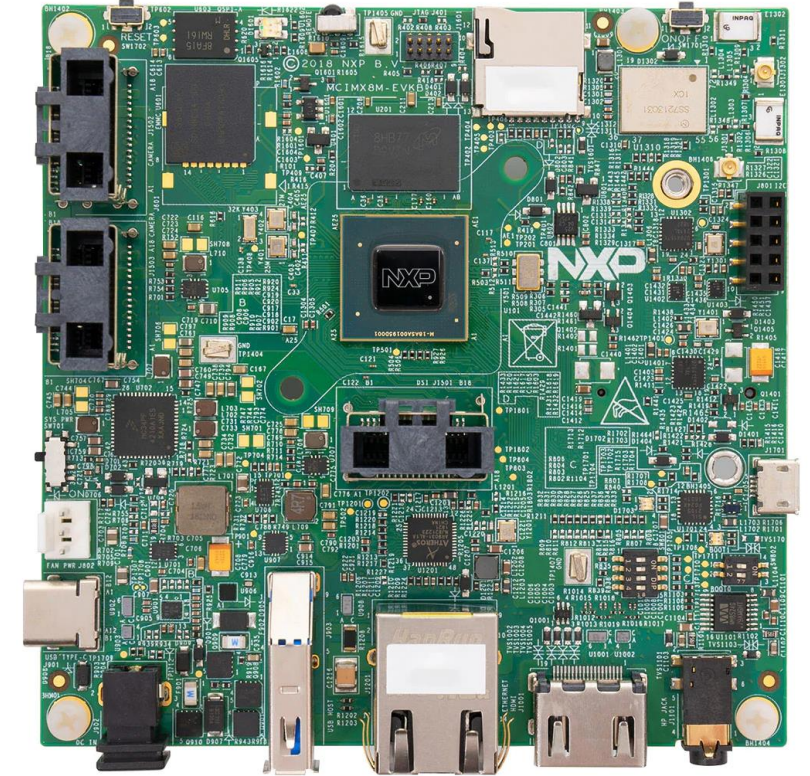
- **Documentation**

- Detailed user guide for building and installing Win10 IoT BSPs

https://www.nxp.com/docs/en/user-guide/i.MX_Win10_User's_Guide.pdf

- Release notes

https://www.nxp.com/docs/en/release-note/i.MX_Win10_Release_Notes.pdf



Partner boards
i.MX 8MQ EVK as example

I.MX TOOLS, SOFTWARE & I.MX8M ON WINDOWS 10 IOT ENTERPRISE

- Latest i.MX Tools and Developer Resources at www.nxp.com/imxtools
- Latest i.MX Software releases at www.nxp.com/imxsw

Supported Operating Systems for Arm® Cortex®-A

Android OS

NXP fully supports the Android™ operating system through board support packages for the i.MX range of application processors and featured tools such as SABRE for tablets.

Embedded Linux

Quickly get your Linux-based designs started with the full-featured and energy-efficient i.MX family of processors by using our Linux development tools.

Android Automotive

NXP's software for Android Automotive enables auto infotainment systems development based on the i.MX Application Processors.

Windows 10 IoT Enterprise

NXP supports the Windows 10 IoT through board support packages (BSPs) on i.MX Applications Processors and featured development boards.

- Windows 10 IoT Enterprise BSP Release Current Status : **BSP 1.1.0**
- Windows 10 IoT Enterprise Current Support Platform : **i.MX 8MQ, i.MX 8M Mini, i.MX 8M Nano, i.MX 8M Plus**



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