

Drive for better vision



A+新銳競賽需求說明

April 26th, 2020

Himax Technologies, Inc.
奇景光電股份有限公司

Help Shaping the Way People See the World

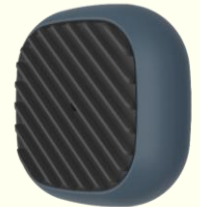
 **Himax**
2000s



 **Himax**
2010s



 **Himax**
2019 and Beyond ...



Himax - Drive for Better Vision

Company

- Founded on 2001
- NASDAQ-listed on 2006
- Rank 4 IC design house in TW
- Around 2,100 employees, > 90% engineers

Offices

- HQ in Tainan, Taiwan
- 9 R&D centers in Taiwan, China, Korea, Israel, and U.S.
- 24 offices across Taiwan, China, Japan, Korea, Israel and U.S

Products

- TFT-LCD: Drivers, TCON, TDDI, Touch Con., OLED Drivers
- LCOS, WLO, 3D SLiM
- CMOS/IoT Sensors
- Always On Smart Sensing, ASIC
- Patents granted 2,929, pending 565
- Customers 200+ in TW, China, Japan, Korea, U.S. and E.U.



Ultra-Low Power Smart Sensing

Applications

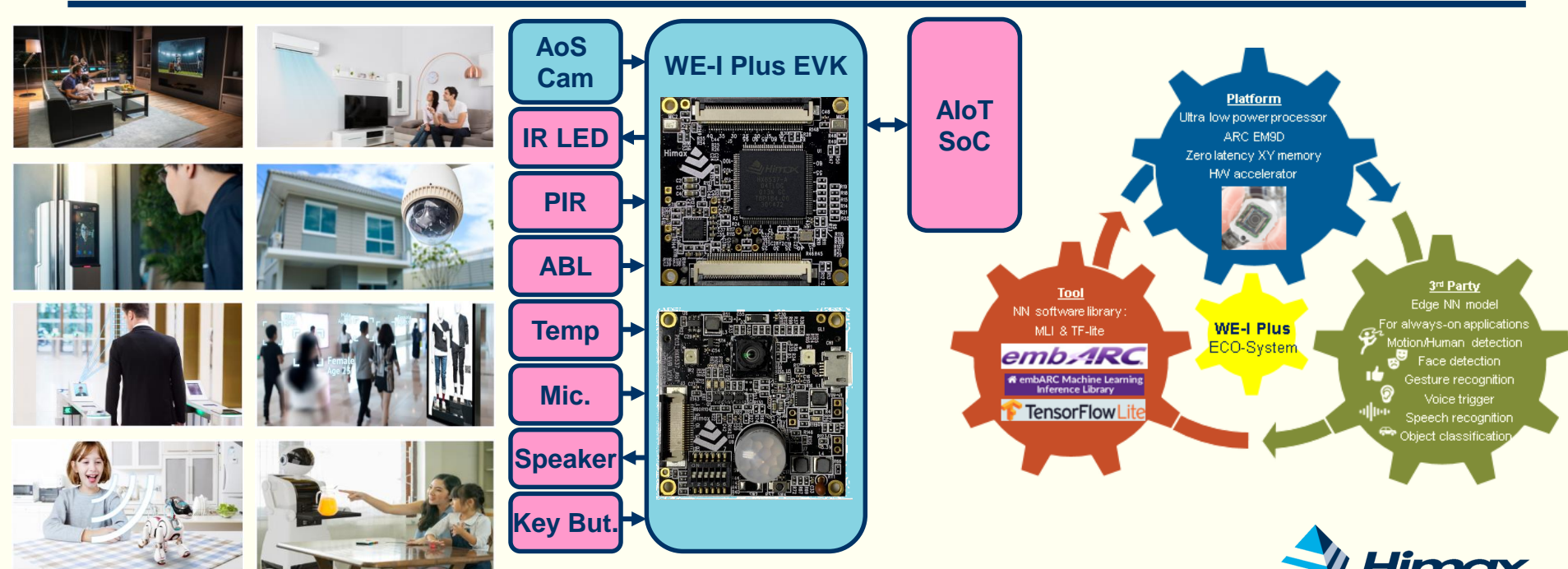
- Smart Home Appliance
- Intelligent Home Security & Safety
- Wise City & Building
- Brilliant Consumer Devices

Key Features

- Ultra Low Power Design With LDO and Multi-State Smart PMU
- Embedded DSP and Image HW Accelerator
- AIoT Security Engine for Boot, OTA and Data/Image Output
- Flexible Peripherals for Image, Voice and Analog Sensors

ECO System

- Ultra Low Power WE-I Plus Platform
- Ultra Low Power 3rd Party CNN/ML Algorithm
- CNN/ML SW Developing Tool Chain
- Compact EVK & SDK Developing Kits



WE-I Plus – Best Edge AI Processor on Battery Powered Devices

Computation Optimization

- Adopts Programmable Processor With The Enhanced DSP Features
- Power-Efficient Image And JPEG Hardware Accelerator For Real-Time Motion Detection, Object Detection, And Image Processing
- Optimized Large SRAM Size To Support Vision And Voice Ultra-Low Power Detection Simultaneously

Power Minimization

- Flexible PMU To Minimize Power Consumption At Suitable Operation Modes For Required Blocks Only
- Ultra-Low Leakage LDO Embedded

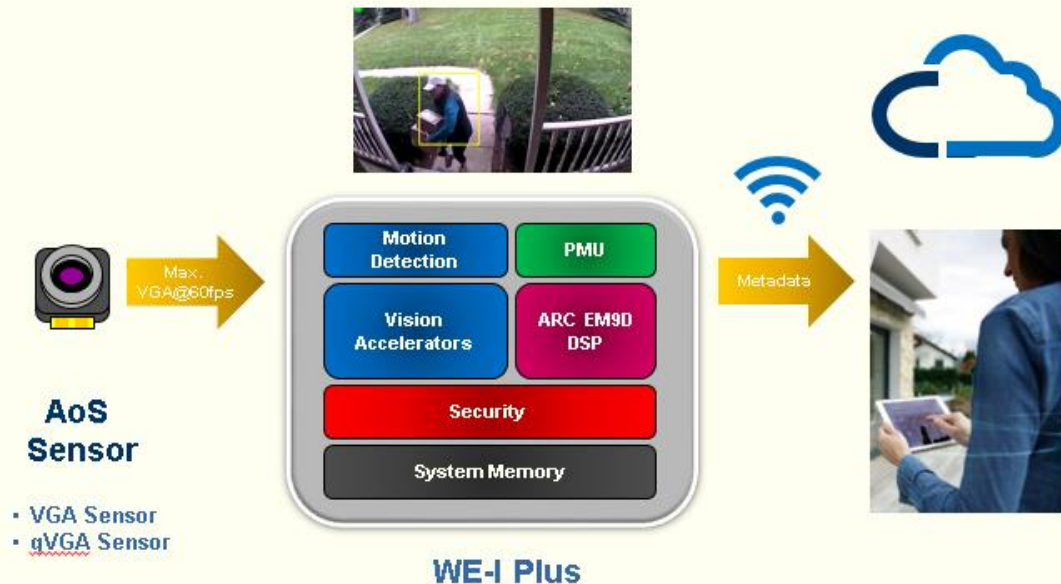
Security Protection

- Fast Security Boot Up
- Safe Security OTA
- Flexible Security Transfer



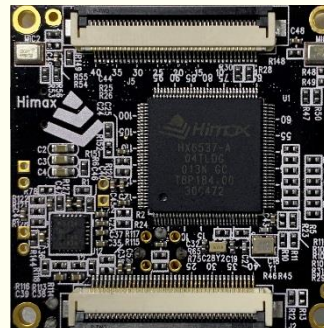
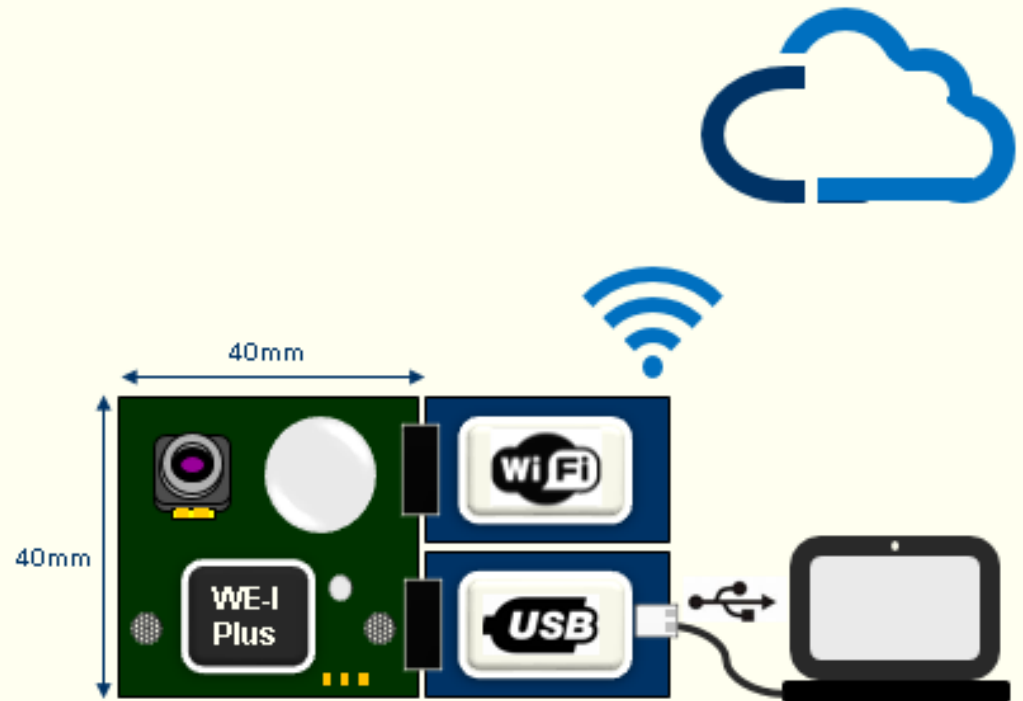
Key Features of WE-I Plus Platform

- Key values of WE-I Plus platform
 - ❖ Computation optimization: **MCU with Enhanced DSP Up to 400MHz**
 - ❖ Ultra-low power consumption: **sub 1mW, qVGA @2fps**
 - ❖ Accuracy and low latency : **VGA @ 1~30 fps**
 - ❖ System security deployment : **Secure boot, OTA, and TLS**
 - ❖ AI eco-system integration : **TensorFlow & SDK.AI**



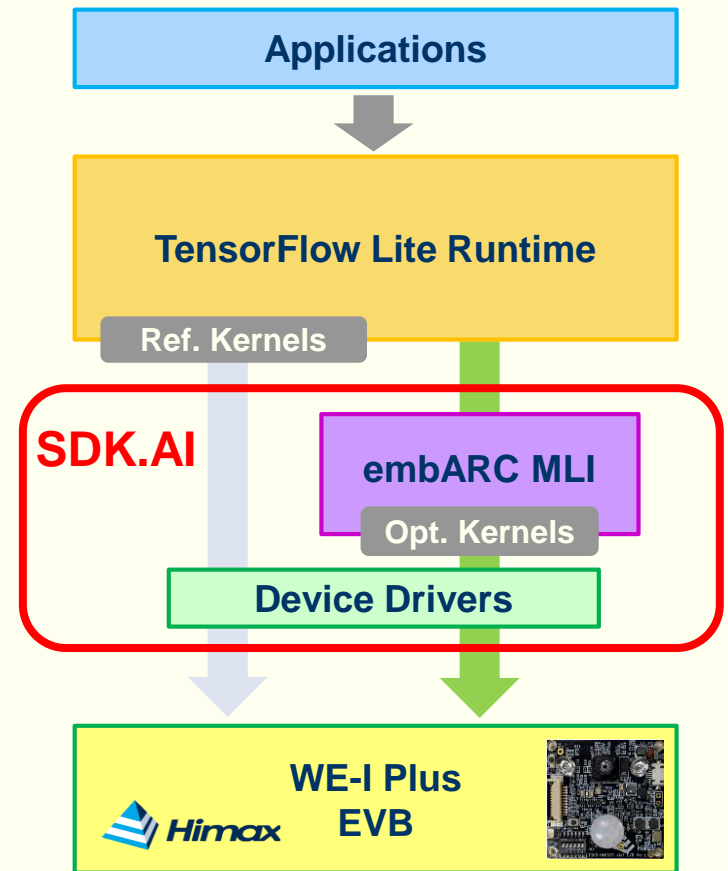
EVK – Evaluation Boards (EVB) for AIoT Application

- Main board
 - ❖ WE-I Plus chip
 - ❖ VGA/QVGA sensor
 - ❖ PIR sensor
 - ❖ Temperature sensor
 - ❖ Ambient light sensor
 - ❖ Microphones
 - ❖ LEDs
- WiFi extension board
 - ❖ WIFI/BT combo module
- USB extension board
 - ❖ USB hub for UART, I2C, SPI link with PC



SDK.AI & MLI Optimized Kernels

- SDK.AI & MLI Optimized Kernels
 - ❖ Optimized operators
 - CONV_2D
 - DEPTHWISE_CONV_2D
 - FULLY_CONNECTED
 - ❖ Unique XY memory allocation to boost convolution performance



AI+ 新銳競賽需求說明

需求大廠：奇景光電股份有限公司

公司/部門簡介：奇景光電為台灣第四大IC設計公司，主要產品為全球TFT LCD Industry IC Total Solutions Market Leader，Always On Smart Sensing 為奇景針對新興AIoT應用規劃開發的新產品平台。

AI投資計畫/金額：2020~2022規劃通用Always On Smart Sensing (WE-I Plus Platform) 建立於下列領域: 1. Smart Home Appliance, 2. Intelligent Home Security & Safety, 3. Wise City & Building ..等ULP Vision+Voice Detection AIoT 應用平台 Total Solutions.

硬體/載體規格

WE-I Plus Platform EVB for ULP Vision+Voice Detection AIoT Devices Includes Features Below

1. Programmable MCU+DSP
2. Vision HW Accelerators
3. Flexible Vision, Voice, Ambient Sensors Fusion Interfaces

軟體平台/技術支援

WE-I Plus SDK includes

1. WE-I Plus HW Devices Drivers
2. SDK AI for MCU+DSP HW Acceleration API
3. Support Tensor Flow Lite Micro Interpreter
4. MCU+DSP Developing Kit

潛在客戶/市場規模

Target Customers in

1. Smart Home Appliance
2. Intelligent Home Security & Safety
3. Wise City & Building

Estimated WW Shipment Q'ty on 2021~2022

1. Smart Home Appliance (34~70M)
2. Intelligent Home Security & Safety (8.3~14.3M)
3. Wise City & Building (11~22M)

需求說明(可多題)

1. 現有AI Vision or Voice solutions 缺少 compact AI CNN models 可以運行在 low computing BW & w/o DRAM MCU/DSP platform 而且可以達到超低功耗、長距離、高辨識率及低誤識率且快速反應時間的要求。藉由符合要求的 compact AI CNN models 在 ULP Battery Power AIoT Devices 應用才能突破 Battery Life >= 6~8 Months 的產品規格。
2. Smart Home Appliance, Intelligent Home Security & Safety, Wise City & Building.

AI+ 新銳競賽導入產業、面臨痛點、實證目的及需求情境

導入產業/場域與面臨痛點(資料公開)

導入產業/場域:

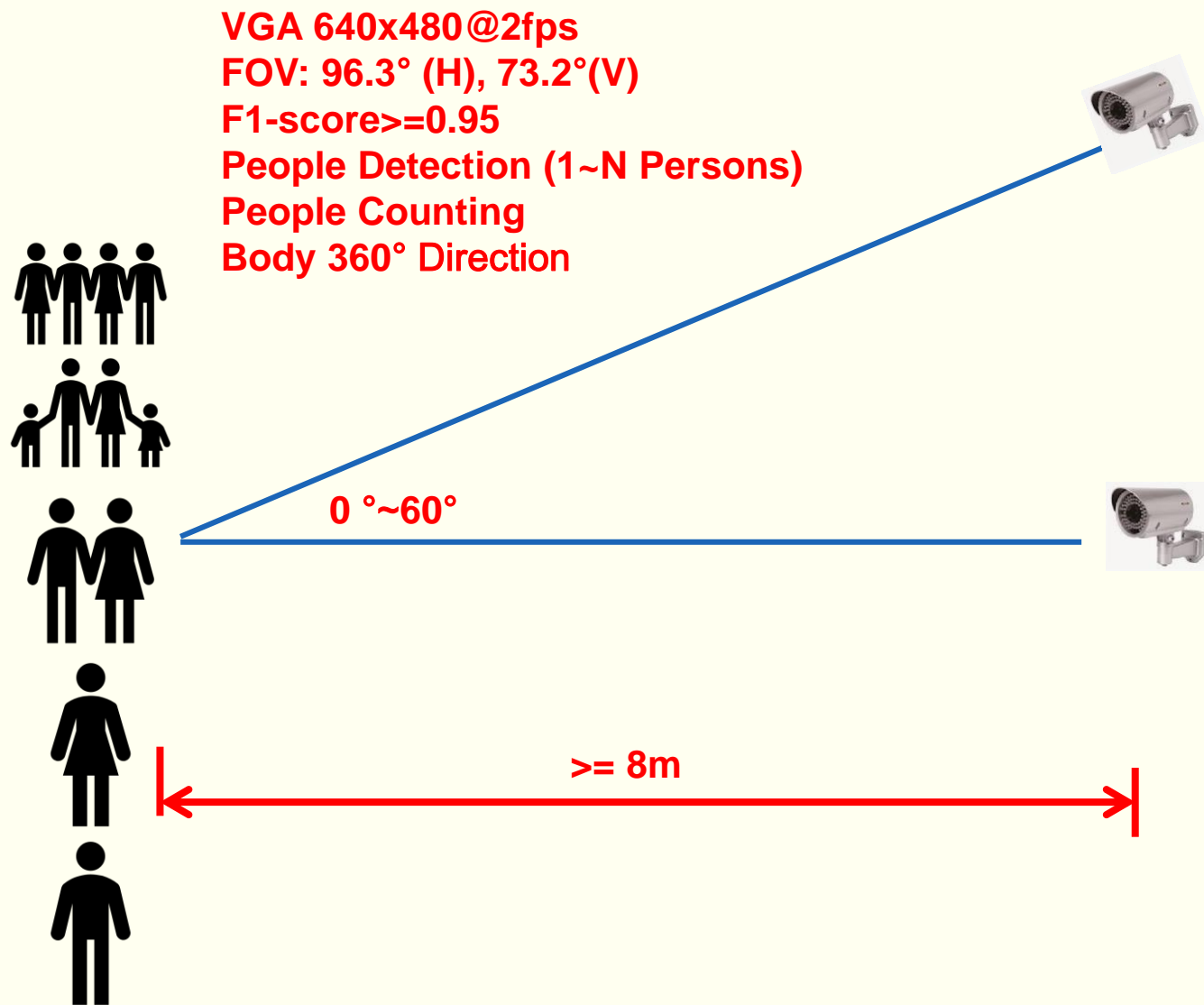
1. Smart Home Appliance
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面臨痛點:

現有AI Vision or Voice solutions 缺少compact AI CNN models 可以運行在low computing BW& w/o DRAM MCU/DSP platform 而且可以達到超低功耗、長距離、高辨識率及低誤識率且快速反應時間的要求。藉由符合要求的compact AI CNN models在ULP Battery Power AIoT Devices 應用才能達到Long Battery Life的產品規格

實證目的(資料公開)	需求情境(資料公開)	硬體裝置/軟體平台提供
<p>解決使用精簡低cycle counts CNN models在超低功耗WE-I Plus platform及VGA camera(640*480, FOV: 96.3(H), 73.2(V))條件下，可以達$\geq 8\sim 10$公尺且F1-score≥ 0.95及快速偵測計算反應時間的各種姿勢人體偵測問題</p>	<p>使用WE-I Plus platform 執行精簡低cycle counts且低誤識率的算法做10公尺內各種姿勢人體實時偵測，運用於監視器的上視到水平角度(0~60度)的各種場景，偵測出人體的大小、涵蓋方向(直立、橫躺、斜站...)、面向角度(正面、背面、側面...) 與動作識別...等資訊</p>	<p>硬體裝置 WE-I Plus Platform EVB for ULP Vision+ Voice Detection AIoT Devices</p> <p>軟體平台 WE-I Plus SDK includes</p> <ol style="list-style-type: none"> 1. WE-I Plus HW Devices Drivers 2. MCU+DSP MLI Library 3. Support Tensor Flow Lite 4. MCU+DSP Developing Tools Kit

AI+ 新銳競賽需求基本門檻





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