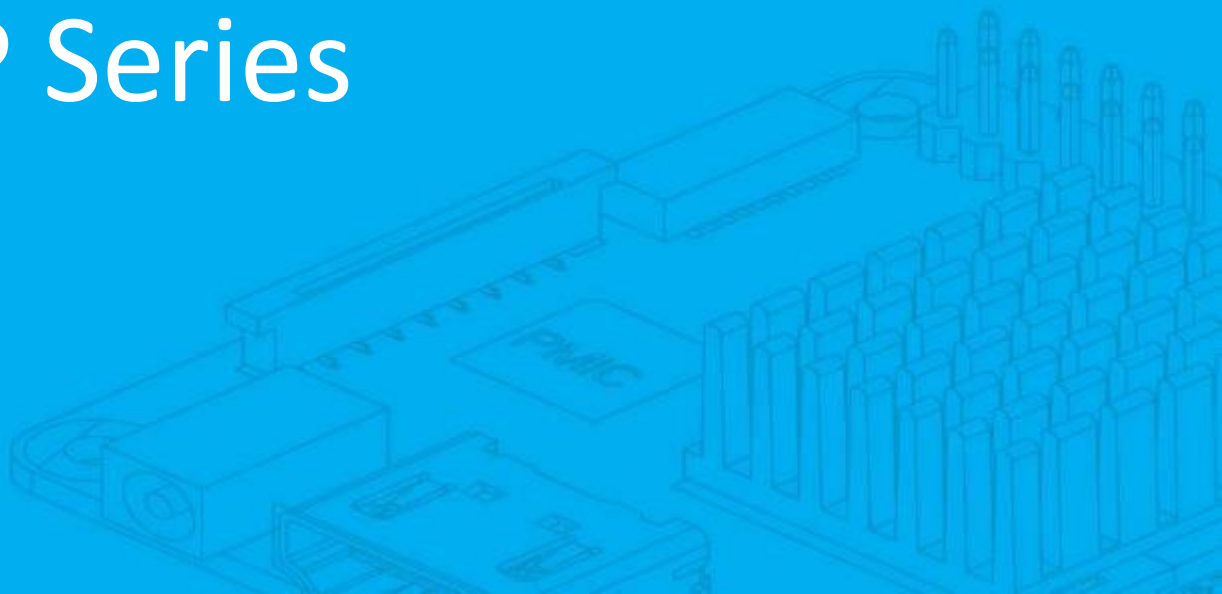




# AI EDGE UP Series

Jason Lu  
Director, PSM  
[jasonl@aaeon.com](mailto:jasonl@aaeon.com)  
AAEON

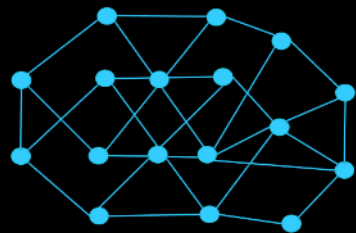


# AAEON and ASUS

- Industrial and Embedded Application
- Longevity
- Revision Control
- Low Volume High Mix Mfg.
- Ruggedized Design



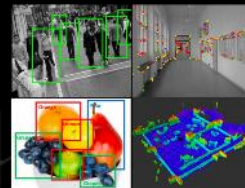
# UP AI Edge



Create your  
model with  
Caffe or  
TensorFlow



Train Your  
Model  
in the Cloud



Deployment





**Centralized AI**  
**≠**  
**Real Time Decision**  
**at the Edge**





AI at the Edge  
with CPUs + GPUs  
=  
Not as Efficient  
(Gflops/W)







AI On The Edge for  
Robots, Drones,  
Portable/Mobile Devices  
Outdoor Devices

=

Efficient (Gflops/W)  
Reasonable Cost  
Industrial Grade Solution



# UP AI Edge

CREDIT SIZED STACKABLE ARTIFICIAL INTELLIGENCE PLATFORM  
FULLY POWERED by Intel® TECHNOLOGY



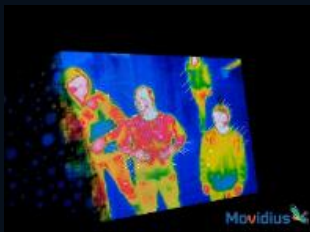
UP CORE PLUS

X86



AI PLUS

FPGA

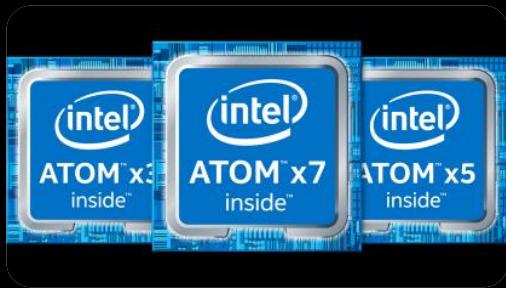


AI CORE

VPU



# UP AI Edge



**Intel®**  
**Atom x5/x7**  
**Celeron/Pentium**

Low Power Consumption  
Quad Core 64 bit x86 Architecture

GPU integrated

Rich I/O

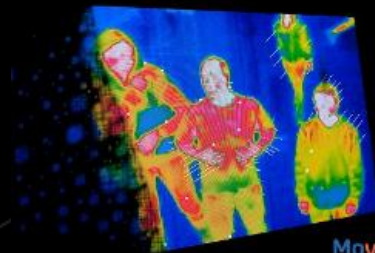


**Intel® Cyclone®**  
**10 GX**

Programmable Versatile Architecture

Super Rich I/O

Good for CPU Offload,  
Real Time High Speed Signal Analysis



**Intel®**  
**MOVIDIUS™**  
**Myriad 2/X**

Video Processing Unit  
(Hardware Neural Network)

Optimized for Machine Learning  
and Real Time  
Pattern Recognition





# UP AI Edge

## UP CORE PLUS

Credit Card Form Factor

Stackable & Expandable

Low Power Consumption

Cost Effective Solution



Low Power Consumption 6<sup>th</sup> Generation Atom, Celeron  
Pentium Quad Core 64 bit x86 Architecture

GPU integrated

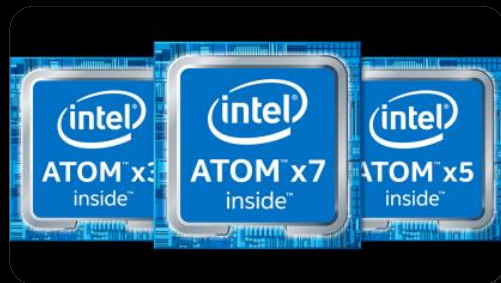
Intel Sensor HUB

Support of Windows 10, Linux Ubuntu, Yocto, Debian



## UP CORE PLUS

Intel® Atom™ x5 / x7 / Celeron® / Pentium®  
2/4/8 GB DDR4 Dual Channel 2400 MHz  
32/64/128 GB eMMC  
DP 4K@60 Hz  
eDP  
CSI 2 Lane + CSI 4 Lane  
USB 3.0 Type A  
USB 3.0 Type B  
WiFi 802.11 AC 2T2R  
2 x 100 pin expansion connector  
Compatible with UP Core expansion board  
12V DC In



# UP AI Edge

**AI PLUS**



**Credit Card Expansion Board**

**Reach I/O**

**Low Power Consumption**

**Movidius via mPCIe**

**Programmable Versatile Architecture**  
**Rich high speed I/O**

**Hardened Floating Point Capabilities**  
**Good for CPU Off-loading**

**Real Time High Speed Signal Analysis**

**Support of Tensor Flow**

**Support of Quartus Design Tools, DSP  
Builder, and HLS Compiler**

**Compatible with Basler LVDS camera**



**BASLER**

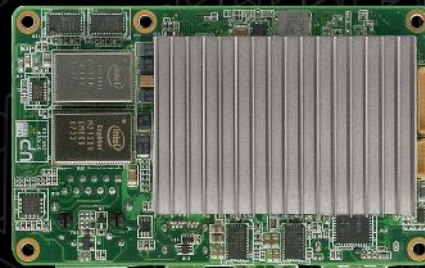


# UP AI Edge

## AI PLUS

Intel Cyclone 10gx 105 / 150 / 220 K1e  
Display Port IN connected to Cyclone  
LVDS IN connected to Cyclone  
USB 3.1 Device Type C connected to Cyclone  
GPIO connected to Cyclone

USB 3.0 Type A connected to mainboard UP Core Plus  
mPCI-Express connected to UP Core Plus  
Gbit Ethernet connected to UP Core Plus





# UP AI Edge



## AI PLUS Target Customers

### Software Developers

- Purpose : Provide easy access to FPGA
- Usage : Offload CPU via OpenCL™ and machine vision via OpenCV

### FPGA Developers

- Purpose : Provide all-in-one versatile expandable industrial cost effective platform which integrates Intel® Atom™ x5/x7/Celeron ®/Pentium ® + Cyclone® 10 Gx
- Usage : Exploit complete FPGA for video acceleration, machine learning, algorithm acceleration







# UP AI Edge

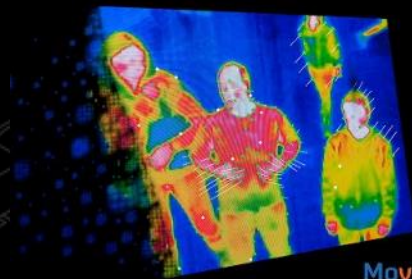
## AI CORE

mPCIe expansion board

MOVIDIUS™ Myriad 2  
Video Processing Unit

Optimized for Deep Learning

Ultra Low Power



Hardware Neural Network

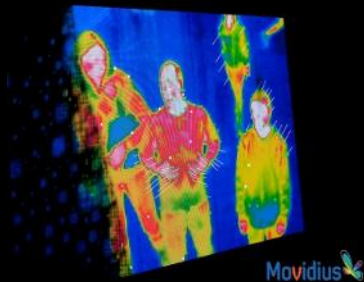
Optimized for Machine Learning and Real Time Pattern Recognition

Support of Tensor Flow & Caffe software

Compatible with all x86 computers with mPCI-Express slot

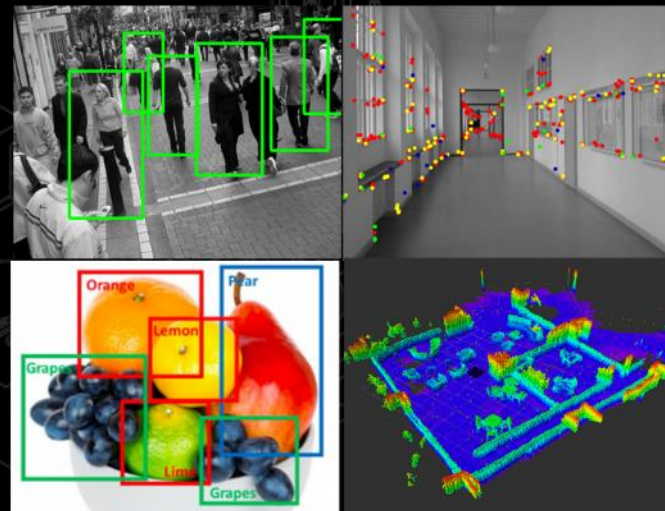


# UP AI Edge

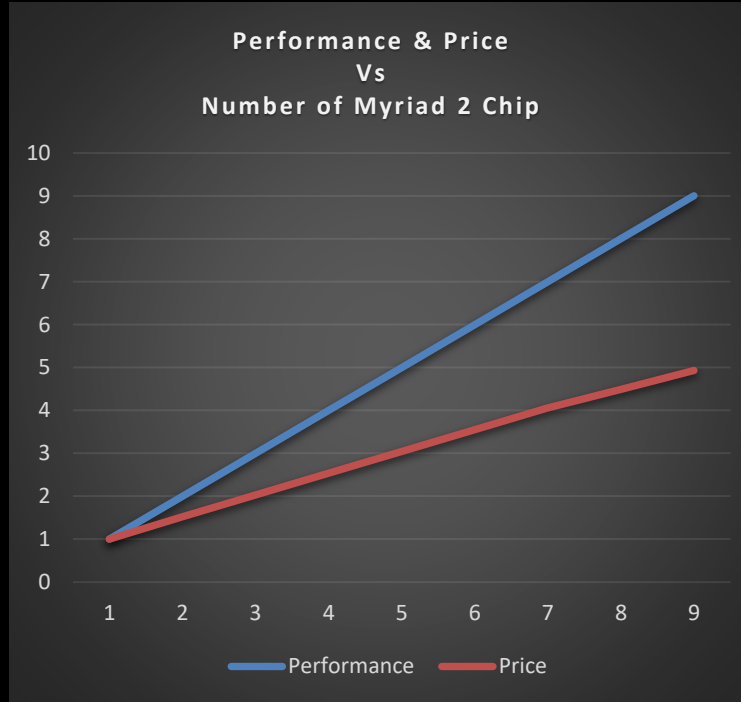
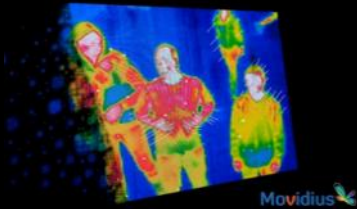


## FEW EXAMPLES OF APPLICATIONS :

- Object Recognition
- People recognition



# UP AI Edge



**Example :**

**Custom Solution with 5  
Myriad 2 onboard**

**Performance = 5 x AI Core  
= 5 x Myriad 2**

**Price = 3 x Price of AI Core**

**$N \times \text{Myriad 2} = N \times \text{Performance} < N \times \text{AI Core price}$**



# UP AI Vision Roadmap



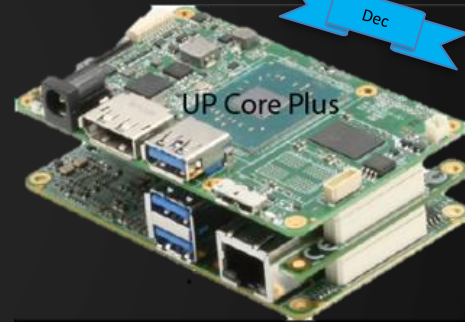
**UP AI Core**  
- mini PCI-e  
- 1x Myriad 2



**UP AI Core-X**  
- mini PCI-e  
- 1x Myriad X



**UP AI Core-XM 2280/42/30**  
- M.2 2280/2242/2230  
- 2x /1x/1x Myriad X



**Vision Plus**  
- Board to board connector  
- Compatible for UP Core Plus  
- 3x Myriad X

# UP AI Edge

From development kit to field deployment



Development  
Kit

AI Edge  
Indoor  
Gateway

AI Edge  
Outdoor  
Gateway



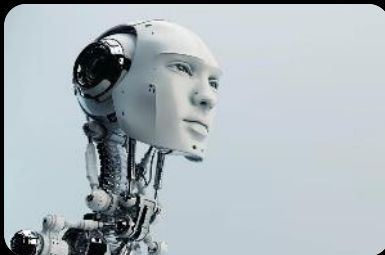


# UP AI Edge

## EXAMPLES OF TARGET APPLICATIONS



**Predictive Maintenance  
Machine Vision**



**Commercial  
Robot**



**Video Surveillance /  
Traffic Control**



**Industrial  
Augmented Reality**



**Intelligent  
Retail**



**Professional Air  
Drone**



# UP AI Vision Development Kits



## UP Squared AI Vision Development Kit

Implement and deploy computer vision solutions and support deeplearning inference across the CPU, GPU, and VPU.

**Authorized OpenVINO™ Platform**

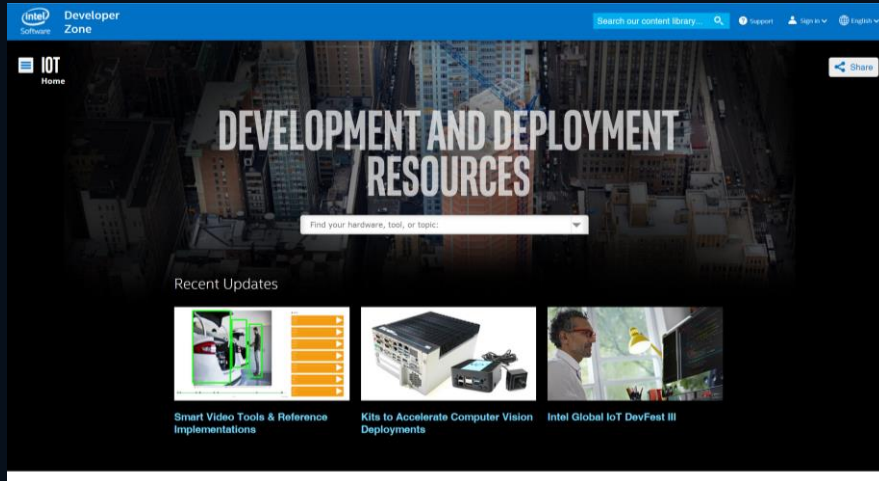


# UP AI Vision Development Kits



## UP Squared AI Vision Development Kit

- ✓ UP Squared board (Atom™ X7-E3950, 4GB RAM / 64GB eMMC)
- ✓ AI Core with Intel® Movidius™ Myriad™ 2 Vision processing Unit (VPU)
- ✓ USB Camera with maximum resolution of 1920 x 1080p at 30 fps
- ✓ Power supply 5V @ 6A
- ✓ Fanless chassis



# The Idea



=

The Most Popular platform  
for prototypes



+



The Most Scalable Technology

+



Industrial Grade Electronic  
Manufacturing Process and Components

# UP Series

## UP Board Series

### UP Boards



UP



UP Squared



UP core

### UP HATs



### UP Kits



### UP System



## UP AI Edge

### Main Boards



UP Core Plus

### AI Accelerator



AI Core

### FPGA



AI Plus


### Expansion





Net Plus





# UP Squared Grove IoT Development Kit


 **Developer Zone**


Search our content library... 

 Support

 Sign in

 English


 **IOT**  
Hardware


 Share


## UP SQUARED\* GROVE\* IOT DEVELOPMENT KIT


Reduce development time for your intensive computing applications with a kit that includes integrated software and end-to-end tools.


[Get Started](#)[Buy](#)



 Documentation

 Tutorials

 Sensor Library

 Forum

# UP Squared Grove IoT Development Kit



## List of Content:

UP Squared Intel Celeron N3350, 2GB DDR4, 32GB eMMC  
Power Supply  
Grove Adapter  
Grove Sensors (LCD RGB Backlight, - Rotary Angle Sensor, Light Sensor v1.2, Button, Temperature & Humidity Sensor)  
16GB USB drive  
USB3.0 OTG cable

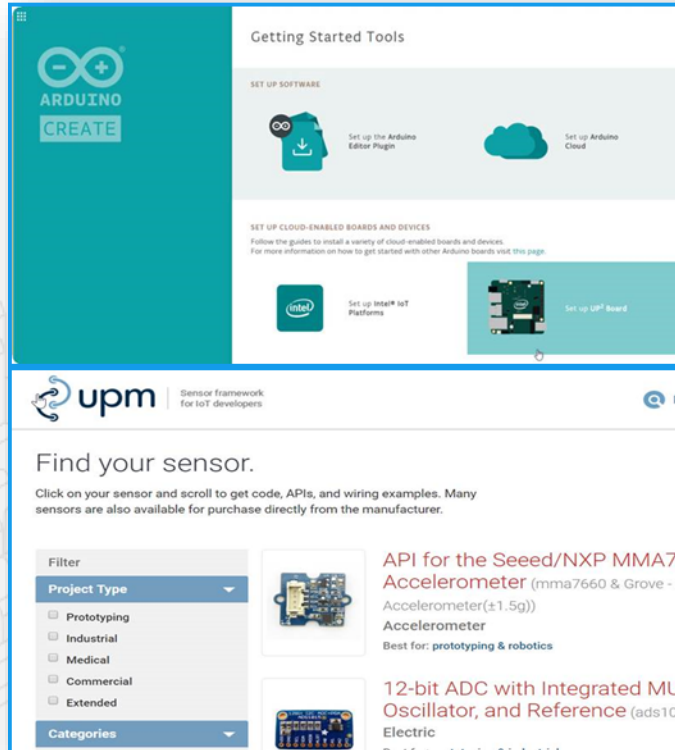
Pre-loaded  and supported by Arduino Create

## Product page:

<https://software.intel.com/en-us/iot/hardware/up-squared-grove-dev-kit>



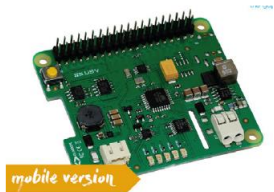
# Arduino Create & UPM



Arduino Create pre-configured:  
An integrated online platform that  
enables developers to write code,  
access content, configure boards,  
and share projects.

Sensor framework ready:  
+400 sensors' libraries integrated  
software framework (open source)

# Expand it



## Mobile power HAT

- 40-pin
- Power by battery pack



## Anybus Common Ethernet Slave

- mPCIe
- Automation protocol



## Power over Ethernet

- 40-pin
- Power over LAN



## eDP adapter

- Convert LVDS to eDP



## Audio HAT

- 40-PIN
- Line-out, MIC, buzzer



## Fanless metal chassis & DIN RAIL kit





# Industrial Grade IoT Gateway Family

UP single boards that are industrially built for pros



UP-GWS01



UP Square



UP Core



UPS-GWS01



UPC-GWS01

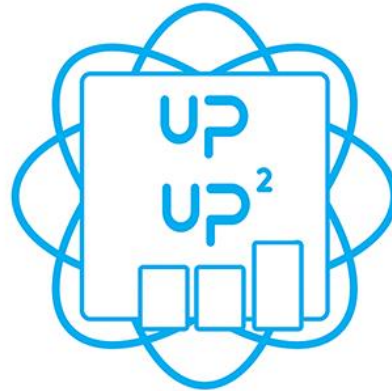




# Industrial Eco-System



CANONICAL





# AI Edge Use Case Video

## **Work Safety:**

[https://www.youtube.com/watch?v=-Wb\\_8VDGZD8&feature=youtu.be](https://www.youtube.com/watch?v=-Wb_8VDGZD8&feature=youtu.be)

## **Brand Recognition:**

[https://www.youtube.com/watch?v=so\\_3ki-Sc2U](https://www.youtube.com/watch?v=so_3ki-Sc2U)

