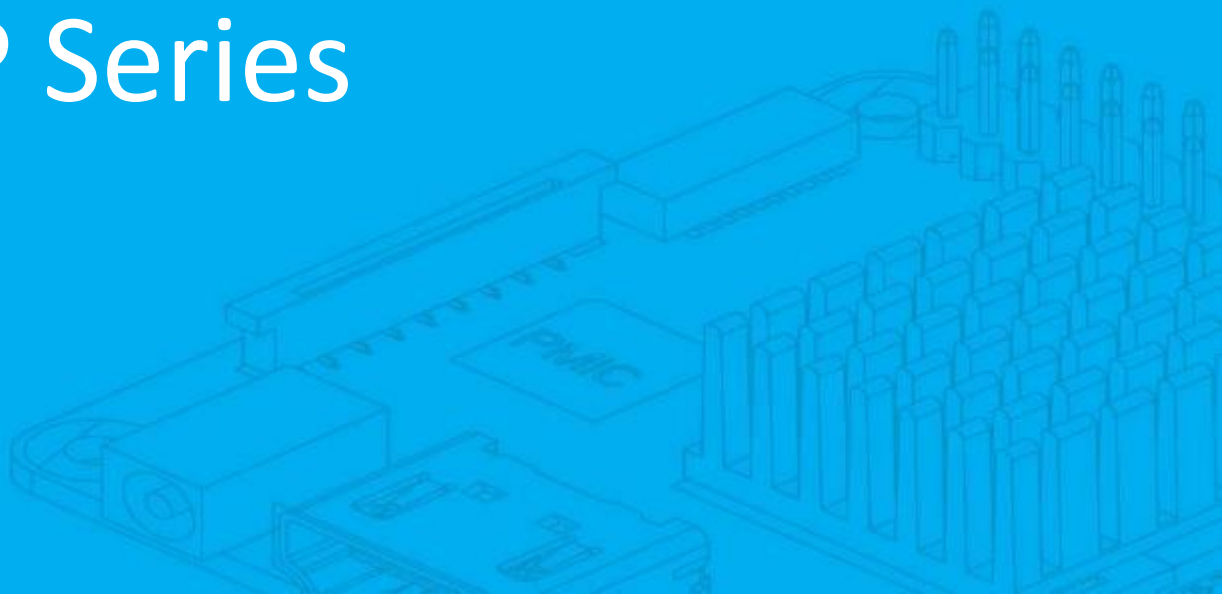




AI EDGE UP Series

Jason Lu
Director, PSM
AAEON





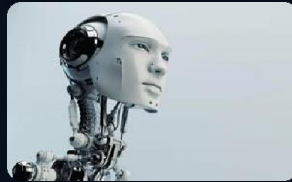
Centralized AI
≠
Real Time
Decision
an the Edge





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 Archit.**



UP AI Edge

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



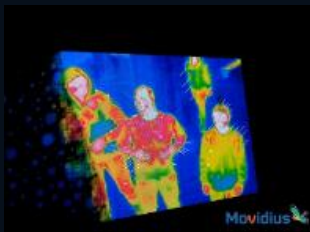
UP CORE PLUS

X86



AI PLUS

FPGA

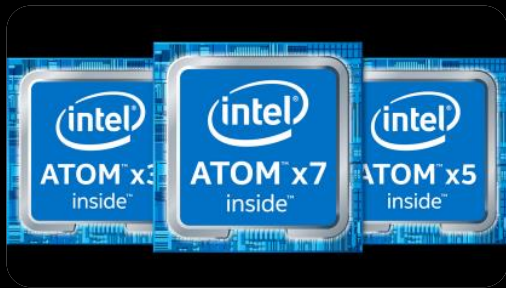


AI CORE

VPU



UP AI Edge



Intel®
Atom x5/x7
Celeron/Pentium

Low Power Consumption
Quad Core 64 bit x86 Architecture

GPU integrated

Rich I/O

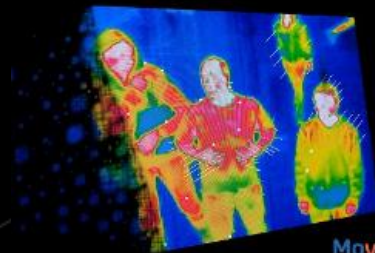


Intel® Cyclone®
10 GX

Programmable Versatile Architecture

Super Rich I/O

Good for CPU Offload,
Real Time High Speed Signal Analysis



Intel®
MOVIDIUS™
Myriad 2

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 6th Generation Atom, Celeron
Pentium Quad Core 64 bit x86 Architecture

GPU integrated

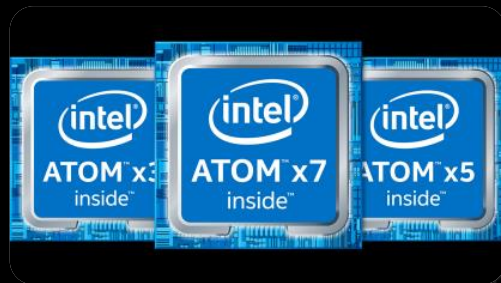
Intel Sensor HUB

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

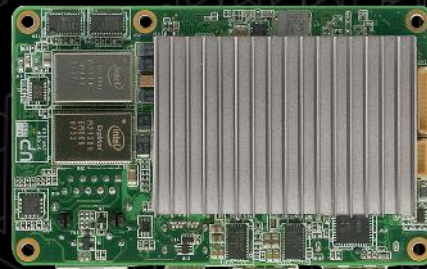


UP AI Edge

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 : Off load 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

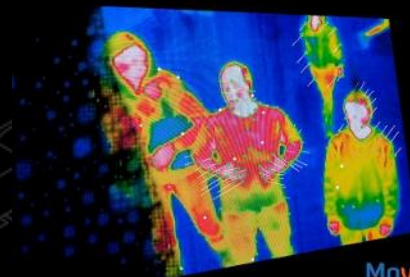
MOVIDIUS™ Myriad 2
Video Processing Unit

Optimized for Deep Learning

Ultra Low Power



Hardware Neural Network



Optimized for Machine Learning and Real Time Pattern Recognition

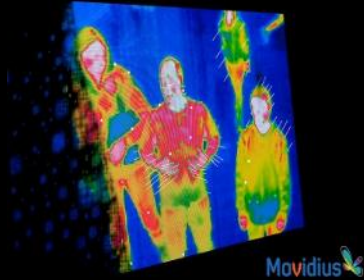
Support of Tensor Flow & Caffe software

Compatible with all x86 computers with mPCI-Express slot

Fully compatible with Intel Neural Compute Stick software suite

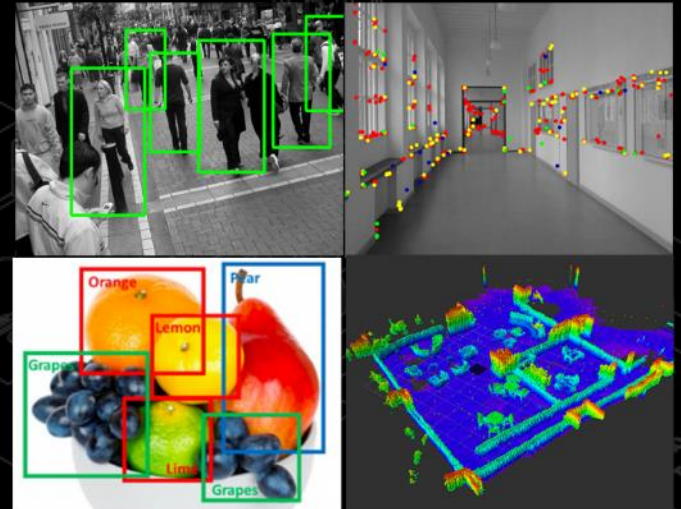


UP AI Edge

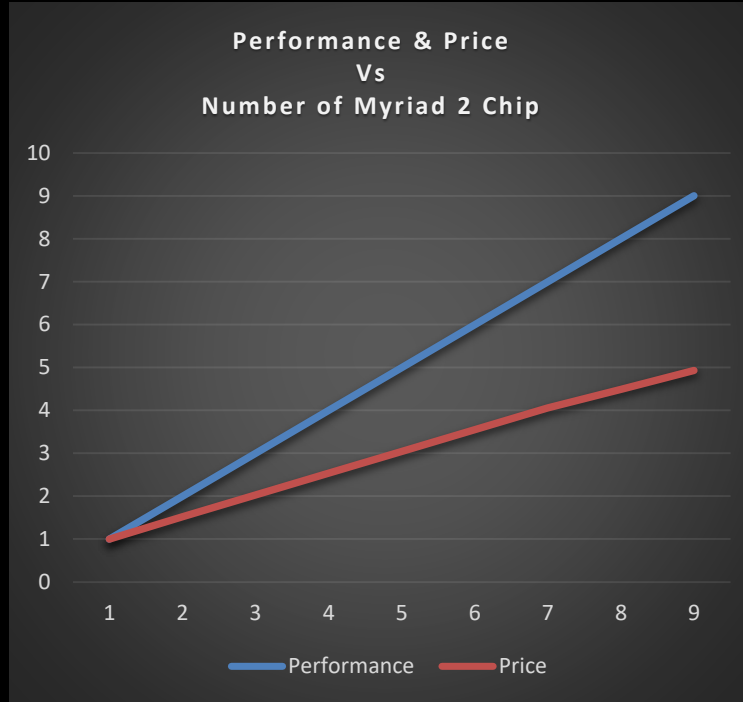
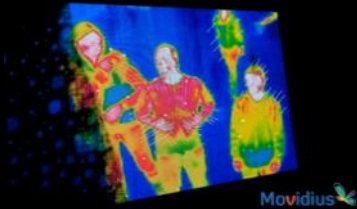


FEW EXAMPLES OF APPLICATIONS :

- 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

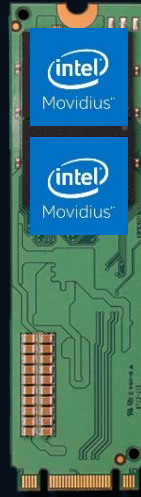
$N \times \text{Myriad 2} = N \times \text{Performance} < N \times \text{AI Core price}$



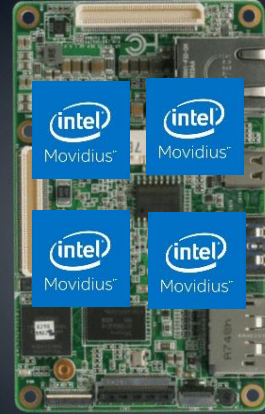
UP AI Vision Roadmap



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



UP AI Core-M
-M.2
-2x Myriad 2



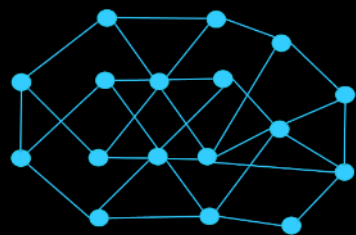
Vision Plus
-board to board connector
- Compatible for UP Core Plus (Apollo Lake)
-4x Myriad 2



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



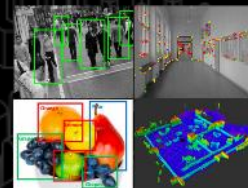
UP AI Edge



Create your
model with
Caffe or
TensorFlow



Train Your
Model
in the Cloud



Deploy it in the
Field on AI Core



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

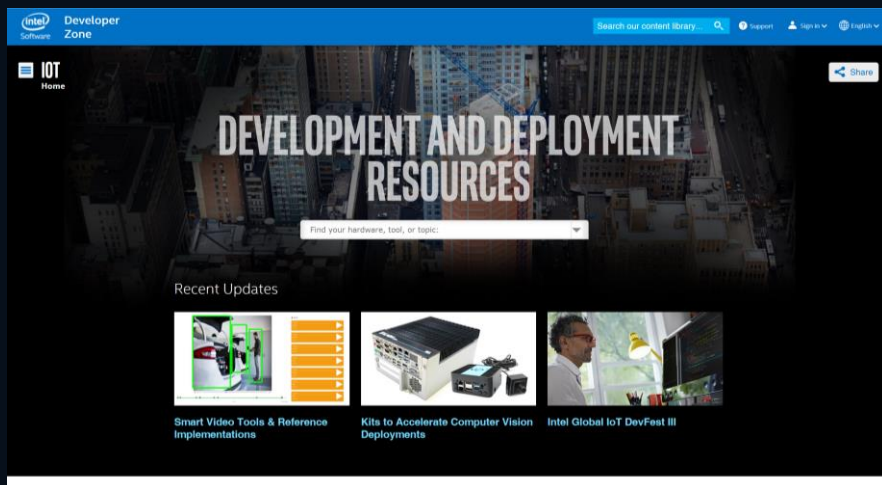


UP AI Vision Development Kits



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


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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

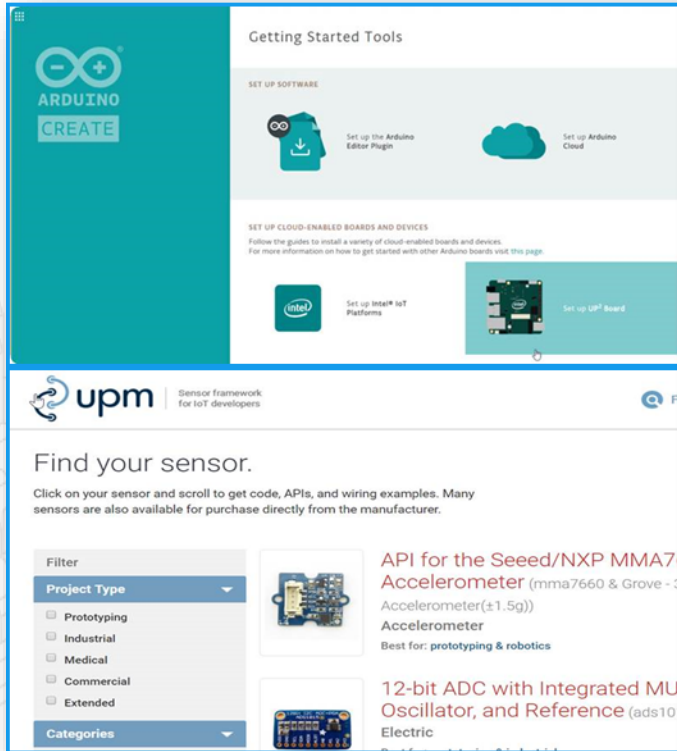
Pre-loaded **ubuntu[®]** OS and supported by
Arduino Create

Product page:

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



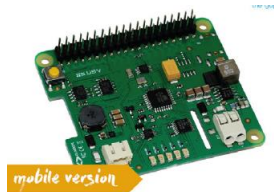
Arduino Create & UPM



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



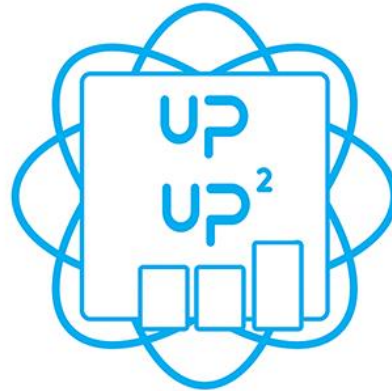
UPC-GWS01



Industrial Eco-System



CANONICAL





AI Edge Use Case Video

Work Safety:

https://www.youtube.com/watch?v=-Wb_8VDGZD8&feature=youtu.be

Brand Recognition:

https://www.youtube.com/watch?v=so_3ki-Sc2U

