

OpenCV AI Kit

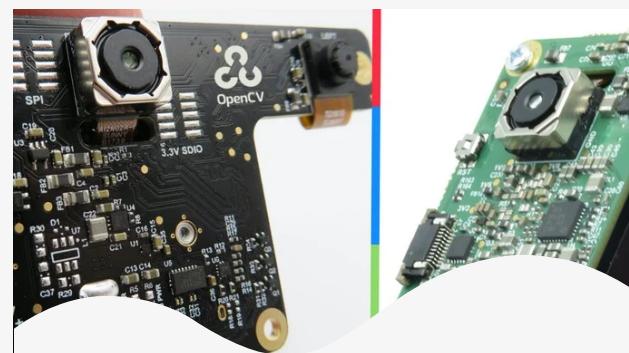
A Tiny Powerful **Spatial AI System** from the Biggest Name in Computer Vision.

[Documentation](#)[KickStarter Page](#)[OAKChina](#)

FUNDED IN JUST 20 MINUTES

Tiny Powerhouse for AI and Computer Vision

OAK consists of the OAK API software and two different types of hardware: OAK-1 and OAK-D. They are tiny artificial intelligence (AI) and computer vision (CV) powerhouses, with OAK-D providing spatial AI leveraging stereo depth in addition to the 4K/30 12MP camera that both models share. They are also both *absurdly* easy to use. Up and running in under 30 seconds, OAK-1 and OAK-D allow anyone to access this power: hobbyists, researchers, and professionals alike. Once you're done tinkering, OAK's modular, FCC/CE-approved, open-source hardware





OAK Color Camera	OAK-D Stereo Camera
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Shutter Type	Rolling Shutter	Sync Global Shutter
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Image Sensor	IMX378	OV9282
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Max Framerate	60fps	120fps
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H.265 Framerate	30fps	/
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Resolution	12MP (4056×3040 px/ 1.55um)	1MP (1280×800 px/3um)
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Field of View	81° DFoV – 68.8° HFoV	81° DFoV – 71.8° HFoV
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Lens Size	1/2.3 Inch	1/2.3 Inch
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Focus	8cm – ∞ (AutoFocus)	19.6cm – ∞ (FixedFocus)
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F-number	2.0	2.2
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OAK Camera Specs

OAK-1 & OAK-D Features

Neural Inference

Object detection, image classification, semantic segmentation, pose estimation, etc.

Warp/Dewarp

Support for additional lenses for fish-eye applications

Object Tracking

Up to 20 objects with unique IDs

Apriltags

Structured navigation

H.264 and H.265 Encoding (HEVC, 1080P & 4K Video)

3.125MB/s (tiny bandwidth) for 4k video; A Pi Zero can record 4k/30fps with this.

Feature Tracking

Optical and Visual Inertial Navigation

JPEG Encoding

12MP Stills

Motion Estimation

Allows real-time background subtraction

MJPEG Encoding

For easy web streaming/etc.

Edge Detection Harris Filtering

Automatic motion-based lossless zooming (OAK-1 Specific)

- 12x lossless zoom with 720p output
- 6x lossless zoom with 1080p output

Stereo Depth (Including Median Filtering, OAK-D Specific)

Extended disparity and subpixel possible for wider dynamic range

3D Object Localization(OAK-D Specific)

- Monocular AI with Stereo Disparity Depth
- Stereo AI (i.e. stereo neural inference) for small object/feature support

Object tracking in 3D space (OAK-D Specific)

- 3D Trajectory in Real-Time
- Enables motion statistics in meters

Powered by Intel Movidius Myriad X



0.05 TOPS
for CV and AI Tasks



The OpenCV AI Kit namely OAK is a tiny low-power hardware edge AI computing module based on Intel Movidius Myriad-X embedded AI chip. Compared to the other AI acceleration solutions based on GPU, CPU, FPGA, or TPU, Movidius is a VPU



4 TOPS
for CV and AI Tasks



The OAK has the same AI chip as the Intel Neural Compute Stick 2 (NCS2) but has more powerful hardware features. OAK shipped with one 1/2.3" Sony 12MP IMX378 capable of 4K@30fps H.265 video streaming, video AI pipelined processing,

and AI tasks than the well-known OpenMV project that only has 0.05 TOPS based on ARM Cortex M7 microcontroller.

sensing, with all 3 cameras it turns the OAK into an RGB+D camera.

Movidius Myriad X Visual Processing Unit	Built-in to every OAK module
Compute Capacity	4 Trillion Ops/sec
Vector Processors	16 SHAVEs
Vision Accelerators	20+
Memory Bandwidth	450 GB/sec

Movidius Myriad X Specs

Movidius' VPU natively supports Intel Openvino software deployment tool like the NCS2 does, OAK is not only Openvino compatible but even unlocked the video pipelined processing power for the neural inference engine to reveal the speed and depth capability that you have never seen on the NCS2.

With the OAK API, now it works with the OpenCV. Unlike any other Myriad X-based solution in the world, unlocking the full potential of this powerful VPU for the benefit of the entire OpenCV community. Feature tracking, hardware-level H.265 support, and 4k output are now unlocked for use by anyone.

OAK vs. Other Myriad X Solutions

Metric	OpenCV AI Kit w/ Raspberry Pi	Other Popular CV + AI Kit
Picture Resolution	12MP (4056×3040)	1MP (1280×720)
Video Resolution	4K	720p
Easy Setup & Development	Yes	No
Efficient Data Path	Yes	No

Low Latency	Yes	Yes
Embeddable	Yes	No
Productizable	Yes	No
CPU Free for User Code	Yes	No
CPU Utilization	Near-Zero	High
Hardware H.265 Support	Yes	No
Hardware JPEG Support	Yes	No
Hardware Feature Tracking Support	Yes	No
Power	6W (max, including Pi)	50 W(max)
Price	\$199-\$299	\$879.95 USD

See What the Pros are Thinking of OAK.

Here is the understanding of OAK from the professionals!

Essentially, they're (almost) plug-and-play eyeballs for gadgets.



Tristan Greene
The Next Web

A reliable, low-cost, low-power-draw computer vision unit like this is a great boon for anyone looking to build a smart device or robot.

A Piece of embedded hardware that is making it easier than ever for computer vision and deep learning practitioners to apply CV/DL to embedded devices..



and See How the Community is Loving OAK.

We were so excited that the OpenCV AI Kit project was successfully funded in Kickstarter with a total amount of \$1,358,318 US dollars. The project goal was funded in just 20 minutes.

OpenCV AI Kit

A tiny, powerful, open source Spatial AI system

[Follow along!](#)

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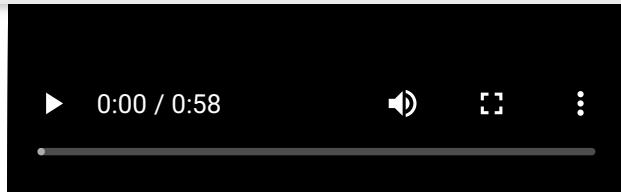
OpenCV

6,564 backers pledged \$1,358,318 to help bring this project to life.

>Last updated August 22, 2020

Embedded AI for Real Products

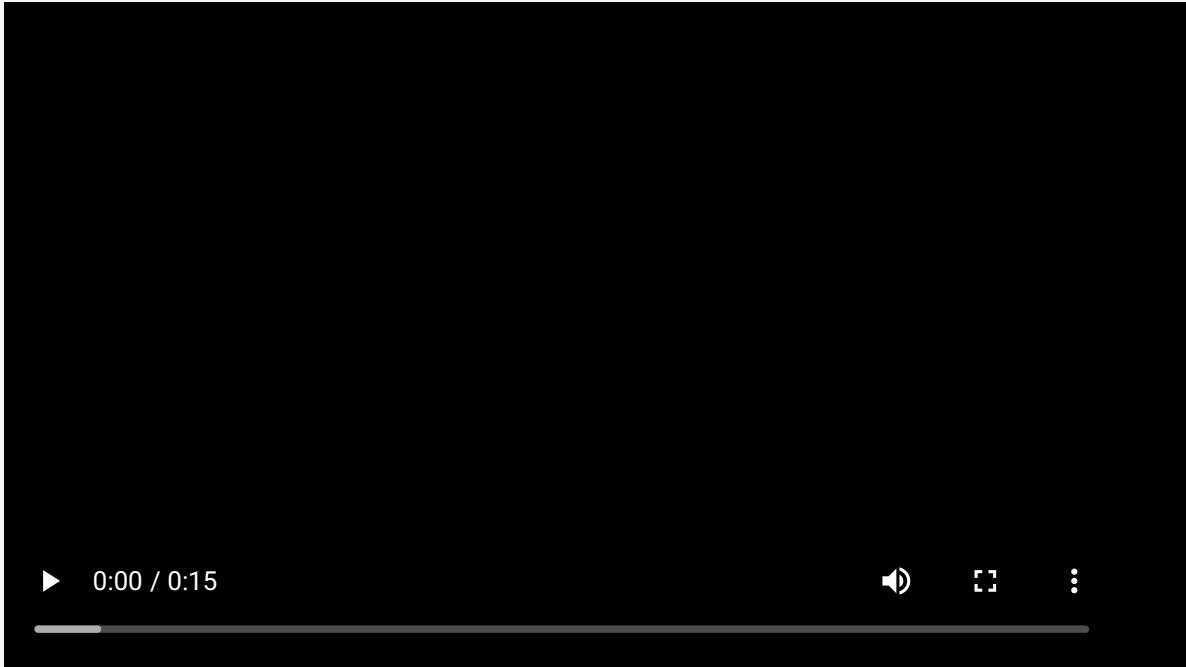
OAK is a modular, open-source ecosystem composed of MIT-licensed hardware, software, and AI training – that allows you



your product. OAK provides in a single, cohesive solution what would otherwise require cobbling together disparate hardware and software components.

Absurdly Easy 30-Second Setup

The OAK API is the fastest way to get started in spatial AI, especially with the OAK-1 module's single USB-C connector which provides it with both data and power. As you can see in the video above, you can go from unboxing the hardware to running an advanced image classifier *in under one minute*.



Use Free Neural Nets or Create Your Own

Emotion recognition, Face detection, Facial Landmark (e.g., corners of eyes, mouth, chin, etc.), General object detection (20-class), Pedestrian Detection, and Vehicle detection. This list gets added to on a regular basis.

OBJECT DETECTION

fps: 30

apple

orange

safety glasses

mask

surprise

fpss: 30

fpss: 30

Includes MobileNet-SSDv2, tiny-YOLOv3, Strawberry Detector, Mask / No Mask Detector, Safety-Glasses, or train your own with our free Google Colab Notebooks.

FACE DETECTION

fps: 30

face

surprise

Includes Facial Landmarks, Expression Estimation, Age Estimation, Pose, Identification and Re-identification

VEHICLE DETECTION

Returned Data

Province: Hebei

Plate: MD7111

Color: Black

Type: Car

Includes Make / Model Recognition, Plate Detection, License Plate Optical Character Recognition

PEDESTRIAN DETECTION

NEW

SEEN 4 TIMES

SEEN 2 TIMES

Includes re-identification of previously seen people

POSE ESTIMATION

Includes 3D location data for Pose Landmarks

TEXT DETECTION

Including Optical Character Recognition



Including depth-assisted Semantic Segmentation

What Does Arducam Do

Arducam proudly works with Luxonis and OpenCV for distributing the OAK-1, OAK-D, and OAK system on module (SOM) and developing more camera modules and carrier boards with a different form factors and more optics options.



Optical Customization



OEM Compact Camera Module



Camera breakout Design



Add-on and Connectivity Extension

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Having great project ideas? Want our help prototyping them with customized modules? Shoot us an email.

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