

INTEL DEMOCRATIZING INTELLIGENCE

DAVID HERMAWAN HEAD OF INTERNET OF THINGS GROUP (IOTG) DAVID.HERMAWAN@INTEL.COM +62 812 845 09 799

AT INTEL

WE'RE POWERING THE FUTURE OF COMPUTING AND COMMUNICATIONS, DELIVERING EXPERIENCES ONCE THOUGHT TO BE IMPOSSIBLE.



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IOT: TRANSFORMING THE WAY WE LIVE AND WORK



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INTEL'S IOT GROUP: FOCUSED ON VERTICAL MARKETS



IOT VALUE REQUIRES END-TO-END SOLUTIONS





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INTEL'S LEADING IOT ECOSYSTEM



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VISION AT THE EDGE IS TRANSFORMING INDUSTRIES WORLDWIDE



RETAIL

Scanning live footage for facial ID (personalized recommendations)

Inventory MGMT & automated restocking

Optimized in-store customer journey



INDUSTRIAL

Optimize production with machine vision cameras

Improve safety & efficiencies with automated systems and connected workers

Perform predictive maintenance



SMART CITIES

Facial recognition for missing persons

Traffic MGMT/Smart parking solutions

3D depth and navigation



HEALTHCARE

Medical Imaging Clinical Diagnostics Scanning



Market Trends are Creating an Inflection Point for Artificial Intelligence

Breakthroughs in Data Science Graph Search -> Neural Nets -> Machine Learning -> Deep Learning

Exponential Growth of Training Data Tabular -> Structured -> Unstructured | 50x Growth by 2020* (Google)

ARTIFICIAL INTELLIGENCE

A program that can sense, reason, act, and adapt

MACHINE LEARNING

Algorithms whose performance improve as they are exposed to more data over time

DEEP Learning

Subset of machine learning in which multilayered neural networks learn from vast amounts of data

Innovation in Computing Integrated Circuits -> GPUs -> FPGAs -> NNP

* Eric Schmidt, Former CEO at Google. https://www.theatlantic.com/technology/archive/2010/07/quote-of-the-day-google-ceo-compares-data-across-millennia/344989/



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Companies in Every Industry are Already Experimenting with Artificial Intelligence

60% of Firms Using or Experimenting



...with Broad Industry Participation

Sectors leading in Al adoption today also intend to grow their investment the most

Future AI demand trajectory1

Average estimated % change in AI spending, next 3 years, weighted by firm size²



Source: McKinsey Global Institute, June 2017

Largest Companies in the World Rely on Intel[®] Technology for AI Advancements



Intel & Google Waymo to support over 3M miles of autonomous driving on public roads



Intel & Amazon partner to deliver Alexa toolkit to extend voice recognition services

facebook

Intel & Facebook collaborated to launch industry first processor for neural network processing



Hardware | Software | Services | Research

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AI: DISTRIBUTED COMPUTE FROM DEVICE TO CLOUD EDGE DRIVERS: BANDWIDTH, STORAGE, LATENCY, SECURITY

of data will be stored, analyzed, and acted on at the edge by 2019¹



share of AI tasks taking place on edge devices (vs. cloud) in 2023²



growth in devices with edge AI capabilities by 2023²



45%

1. Source: IDC FutureScape: Worldwide Internet of Things 2017 Predictions 2. ABI Research +62-812-8450-9799



INTEL[®] VISION ACCELERATOR DESIGNS BREADTH AND SCALE FOR DEVELOPERS



NEW VERTICAL MARKET OPPORTUNITIES

Scalable devices and tools to enable broad edge vision and inferencing across many markets

EXPANDS POSSIBLE USE CASES

Allows developers to create applications for a wide range of use cases that require various price/performance/power

HIGH PERFORMANCE, INFINITE PORTABILITY

Programmable with the OpenVINO[™] toolkit and suite of Intel® Vision Products software tools



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Intel Computer Vision Portfolio



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INTEL[®] VISION PRODUCTS UNLEASHING GROWTH FOR AI AT THE EDGE

INTEGRATED

GRAPHICS

(intel) IRIS

INTEL® VISION Accelerator Design Products



FPGA VPU

OPENVINOTM TOOLKIT Develop once - Deploy across intel architecture - Leverage common algorithms





CPU

(intel)

intel

CORE 17

intel

ATOM

íntel

INTRODUCING... INTEL® VISION ACCELERATOR DESIGN PRODUCTS ACCELERATING DEEP LEARNING INFERENCE AT THE EDGE

Intel[®] Vision Accelerator Design with Intel[®] Movidius[™] VPU Intel[®] Vision Accelerator Design with Intel[®] Arria[®] 10 FPGA



Optimize Vision/Smart Video Solutions from Edge to Cloud

Deliver Fast, Efficient, High Quality Video/Computer Vision Processing End to End



ACHIEVE

- High Performance
- Low Power Consumption
- Programmability Across Hardware Blocks
- Fast Time-to-Market

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INTRODUCING INTEL® NEURAL COMPUTE STICK 2









UP TO **BX1 HIGHER** PERFORMANCE

On deep neural networks compared to Intel® Movidius™ Neural Compute Stick MORE CORES. MORE AI INFERENCE.

- Start quickly with plug-and-play simplicity
- Develop on common frameworks and out-of-box sample applications
- ✓ Prototype on any platform with a USB port
- ✓ Operate without cloud compute dependence

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*MSRP is not a guarantee of final retail price. MSRP may be changed in the future based upon economic conditions.

INTEL[®] AI: IN PRODUCTION Providing clarity on...

	WHERE ARE INTEL VISION ECOSYSTEM PARTNERS & OFFERINGS 	WHERE TO FIND INTEL PRODUCTS & RESOURCES FOR AI AT THE EDGE	WHO TO PARTNER WITH TO ENGAGE NEW SEGMENT & MARKET OPPORTUNITIES	WHERE ARE PRODUCTS ON INTEL® VISION TECHNOLOGY FOR AI/IOT SOLUTIONS IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	WHAT TO DO IF NEW TO INTEL'S USION ECOSYSTEM
	OpenVINO™ toolkit & NCSDK Community Vision Ecosystem Market Leaders			Partners w/ OpenVINO™ toolkit Proficiency	
In	tel® IoT Market Ready Solutions fo	r Al	Intel® IoT Solution Aggregators Intel® AI Academy		
Inte	el® Movidius™ Neural Compute Stic	k Intel® IoT RFP Ready	Kits for Al Intel® IoT S	olutions Alliance Dev	eloper Tools, Kits & Software

david.hermawan@intel.com +62-812-8450-9799

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MACHINE VISION

ASSET INSPECTION

ROBOTICS

AUTOMATION

PUBLIC SAFETY AND SECURITY

EMERGENCY RESPONSE

TRAFFIC MANAGEMENT

SITUATIONAL AWARENESS

INTEL® AF IN PRODUCTION A AT HE EDGE FOR EADING IOT USE CASES

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INVENTORY MANAGEMENT TRAFFIC PATTERNS AND HOTSPOTS

TARGETED ADVERTISING

THEFT PROTECTION



DRUG DISCOVERY

SENSORY AIDS

ENHANCED DIAGNOSTICS

PATIENT CARE

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INTEL® VISION PRODUCTS DELIVERING RESULTS

AGENT[®]

SMART CITIES

10x performance increase with OpenVINO[™] toolkit in just 3 weeks of development

axx() nsoft

SURVEILLANCE

9000+ surveillance cameras used to protect 2 Million+ fans with 9.1x performance increase using OpenVINO[™] toolkit

RNAP

HEALTHCARE

4x performance increase using OpenVINO[™] toolkit for classifier of aged macular degeneration images



TRANSPORTATION

In-train vision platform enables crossroads pedestrian & vehicle identification at crossroads + on-train empty seat detection



SMART RETAIL

Retrieve correlative analytical data to store operational overviews of top performing traffic, shopper movement, revenue, and conversion rates



SAFETY

2.3x speed increase in human face ID for secure facilities with OpenVINO[™] toolkit on Intel[®] CPUs

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EQUIPMENT PROVIDERS

SOFTWARE AND ANALYTICS PROVIDERS

SYSTEM INTEGRATORS

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SINTEL® AI: IN PRODUCTION

PMENT MAKERS

SYSTEM INTEGRATORS

CLOUD SERVICE PROVIDERS

XAAS PROVIDERS



Key Vision Solutions Optimized by Intel® Distribution of OpenVINO[™] toolkit



Philips

Intel teamed with Philips to show that servers powered by Intel® Xeon® Scalable processors & Intel® Distribution of OpenVINO[™] toolkit can efficiently perform deep learning inference on patients' X-rays & computed tomography (CT) scans, without the need for accelerators. Achieved breakthrough performance for AI inferencing:

188x increase in throughput (images/sec) on Bone-age prediction model.

38x increase in throughput (images/sec) on Lung segmentation model.

"Intel[®] Xeon[®] Scalable processors and OpenVINO toolkit appears to be the right solution for medical imaging AI workloads. Our customers can use their existing hardware to its maximum potential, without having to complicate their infrastructure, while still aiming to achieve quality output resolution at exceptional speeds." — Vijayananda J., chief architect and fellow, Data Science and AI, Philips HealthSuite Insights, India

White Paper

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Key Vision Solutions Optimized by Intel[®] Distribution of OpenVINO[™] toolkit



GE Healthcare*5

The Intel® Distribution of OpenVINO[™] toolkit helped GE deliver optimized inferencing to its deep learning image-classification solution. By bringing AI to its clinical diagnostic scanning, GE no longer needed an expensive 3rd party accelerator board, achieving:

- 5.9x inferencing performance above the target
- 14x inferencing speed over the baseline solution
- Improved image quality, diagnostic capabilities, and clinical workflows

With the OpenVINO[™] toolkit, we are now able to optimize inferencing across Intel[®] silicon, exceeding our throughput goals by almost 6x," said David Chevalier, Principal Engineer for GE Healthcare. "We want to not only keep deployment costs down for our customers, but also offer a flexible, high-performance solution for a new era of smarter medical imaging. Our partnership with Intel allows us to bring the power of AI to clinical diagnostic scanning and other healthcare workflows in a cost-effective manner."

Intel-GE Healthcare, Intel® Software Development Tools Optimize Deep Learning Performance for Healthcare Imaging

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Success Stories/Case Studies

Full Case Study list



NexCOBOT Delivers Robotics with AI for Industry 4.0L

NexCOBOT, a NEXCOM company, offers a flexible, modular robotics solution integrating artificial intelligence (AI) with machine vision, powered by Intel® Vision Accelerator Design products and optimized by Intel® Distribution of OpervINO[®] toolkit.



Philips Performs Al-Driven Medical Imaging Efficiently and Cost-Effectively on Intel® CPU– Based Systems

Philips demonstrates breakthrough performance for AI inferencing of healthcare workloads run on servers powered by Intel® Xeon® Scalable processors and optimized with the OpenVINO[™] toolkit.



QNAP/IEI Develop AI Solutions for Healthcare

Together, Intel and QNAP/IEI have come up with a solution that offers developers, data scientists, medical researchers, and students a quick-todeploy computer vision system combining a workstation, deep learning software development kit (Intel® Distribution of OpenVINO™ toolkit), and powerful NAS.



For Somatic, Deep Learning Brings Touch to Robots

Deep learning algorithms that enable touch as well as vision can create tremendous opportunities for robotics applications. Intel® Software Development Tools can help devs take advantage of enabling technologies that bring touch to the forefront and are fueled by the latest artificial intelligence (AI) advances.

New!



ADLINK and Touch Cloud Deliver AI Solutions Powered by Intel® Vision Products

DLINK, Touch Cloud, and Intel provide a turnkey AI engine to assist in data analytics, detection, classification, and prediction for a wide range of use cases, optimized by Intel Distribution of OpenVINO toolkit.



Advantech Addresses Major Retail Dilemmas with Intel® Vision Products

Advantech deploys a combination of hardware and software including cameras, AI deep learning, and video analysis technology optimized by Intel® Distribution of OpenVINO[™] toolkit and Intel® Vision Accelerator Design products.



Agent VI* Delivers the Next Generation of Digital Security and Surveillance Solutions

Intel® Distribution of OpenVINOTM toolkit is the centerpiece of computer Agent VI's next-gen vision solutions.



GeoVision Gets a 24x Deep Learning Algorithm Performance Boost

GeoVision turbo-charges its deep learning facial recognition solution using Intel® System Studio and the OpenVINO™ toolkit.



GE Healthcare and Intel Optimize Deep Learning Performance for Healthcare Imaging

Intel® Math Kernel Library and OpenVINO[™] toolkit help bring the power of AI to clinical diagnostic scanning and other healthcare workflows.



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LITTLE RIPPER LIFESAVER UAV* IMMEDIATE DANGER DETECTION AND RESPONSE TIME

- Intel[®] Movidius[™] Neural Compute Stick was used with Australia's Little Ripper Lifesaver UAV to monitor the New South Wales coastline for sharks
- This application shows that AI processing can be performed directly on an edge device, allowing for more immediate danger detection and response time

CLEANWATER AI* WATER BACTERIA DETECTION

- CleanWater AI* was created by Intel Innovator Peter Ma as an effective system for identifying water bacteria using pattern recognition and machine learning
- Offline analysis is accomplished with a digital microscope connected to a laptop running Ubuntu* and the Intel[®]
 Movidius[™] Neural Compute Stick. After analysis, contamination sites are marked on a map in real time



FLIR FIREFLY* Machine Learning in Camera

- The FLIR Firefly* machine vision camera development was accelerated using Intel[®] Movidius[™] technology for prototyping and large-scale commercial production
- Rapid prototyping based on the Intel[®] Movidius[™] Neural Compute Stick streamlined the early development of machine learning in the camera and enabled the company to produce the solution more quickly

DOCTOR HAZEL* Skin cancer screening

- Doctor Hazel* skin cancer screening service is a real time screening device powered by artificial intelligence
- Doctor Hazel* relies on an extensive library of images to distinguish between skin cancer and benign lesions, making it easier for people to seek professional medical advice
- The solution uses the Intel[®] Movidius[™] Neural Compute Stick to quickly deploy its machine learning algorithm across edge devices