

Solution Brief

AI Vision
Cross-Industry Applications



AI Visual Recognition Drives Creative New Solutions in Contactless Services

Advantech FaceView, built with the CyberLink FaceMe® SDK, uses key Intel® technologies to make visual recognition more accessible and valuable to businesses everywhere

ADVANTECH

CyberLink

Advances in AI vision technology are making facial characteristic recognition more accessible and economical for organizations to deploy. New use cases are springing up that enable smart infrastructure, help control access to secure areas, generate more personalized retail experiences, and encourage health-conscious behaviors such as wearing masks during global health events. Quality-of-life improvements are emerging with growing enthusiasm and innovative uses for object recognition technology. Business end users and consumers who want to enjoy the benefits that AI vision technology brings to their work or life environments are volunteering or preregistering to participate. Now the focus is on developing quick, economical means to deploy these solutions while adhering to safety standards and expectations.

"In addition to its high ranking on the National Institute of Standards and Technology (NIST) list for facial characteristic recognition technology, FaceView has achieved a 99.7 percent accuracy rate.¹ Customers know the name and are aware of our potential value."

—Alan Kao, product manager at Advantech

Use cases for facial object recognition technology



Smart building

- Contactless elevator
- Tenant recognition
- Special facilities access such as gym or garage



Retail

- Self-service kiosk
- Personalized omnichannel experiences
- Mask detection, temperature sensor integration



Factory

- Heavy equipment authorization and access
- Employee clock-in and metrics
- Secured area control



Transportation

- Anonymized passenger counting
- Contactless fare and ticketing
- Social distancing analysis

Challenge: The need for accuracy and performance

Traditional visual recognition deployments have required enormous processing power. Faces, in particular, are highly differentiated subject matter compared to inanimate objects such as vehicles or consumer goods. AI models and parsing need to be extremely accurate and nuanced in order to be useful. And with greater accuracy come greater performance requirements. In traditional configurations, cameras would generate dense visual data that would then flow upstream to cloud networks for processing. However, this required not only intensive computing performance in the cloud, but also a robust network infrastructure to handle the massive backhauling of data. These challenges have made visual recognition deployments aspirational at best—and beyond reach at worst—for most organizations, until recently.



Solution: Edge AI visual compute with 99.7 percent accuracy¹

The Advantech FaceView solution, enabled by the CyberLink FaceMe® software development kit (SDK) with Intel Atom® processors, Intel® Movidius™ Myriad™ VPU, and optimized with the Intel® Distribution of OpenVINO™ toolkit, delivers both the visual recognition accuracy and edge AI performance needed to drive emerging characteristic recognition use cases. By offloading visual processing and AI object recognition to edge-level devices, the FaceView solution eliminates the need to backhaul data to the network for processing. This saves on infrastructure costs while enabling fast results and responsive experiences for end customers at

the location of the edge devices. And organizations can still send data upstream to centralized clouds and server systems for additional processing or analytics.

Performance and capabilities aside, the combined Advantech and CyberLink solution delivers exceptional accuracy, which is essential for success. Alan Kao, product manager at Advantech, comments, “In addition to its high ranking on the National Institute of Standards and Technology (NIST) list for facial characteristic recognition technology, FaceView has achieved a 99.7 percent accuracy rate.¹ Customers know the name and are aware of our potential value.”

How it works

FaceView software is installed on an edge AI inference system enabled by the Intel Atom processor and Intel® Movidius™ Myriad™ X VPU. Cameras and sensors at the site of data generation will pass data to the edge AI system, where the FaceView software performs AI inference for visual recognition. The result of this inference flows upstream

over a 4G/LTE wireless connection to either an edge AI server with more processing power or a private cloud network for analysis and action. At this point, the edge or cloud server can trigger certain behaviors, such as granting access to a building or a piece of equipment or loading a customer's retail profile for personalized experiences on-site.

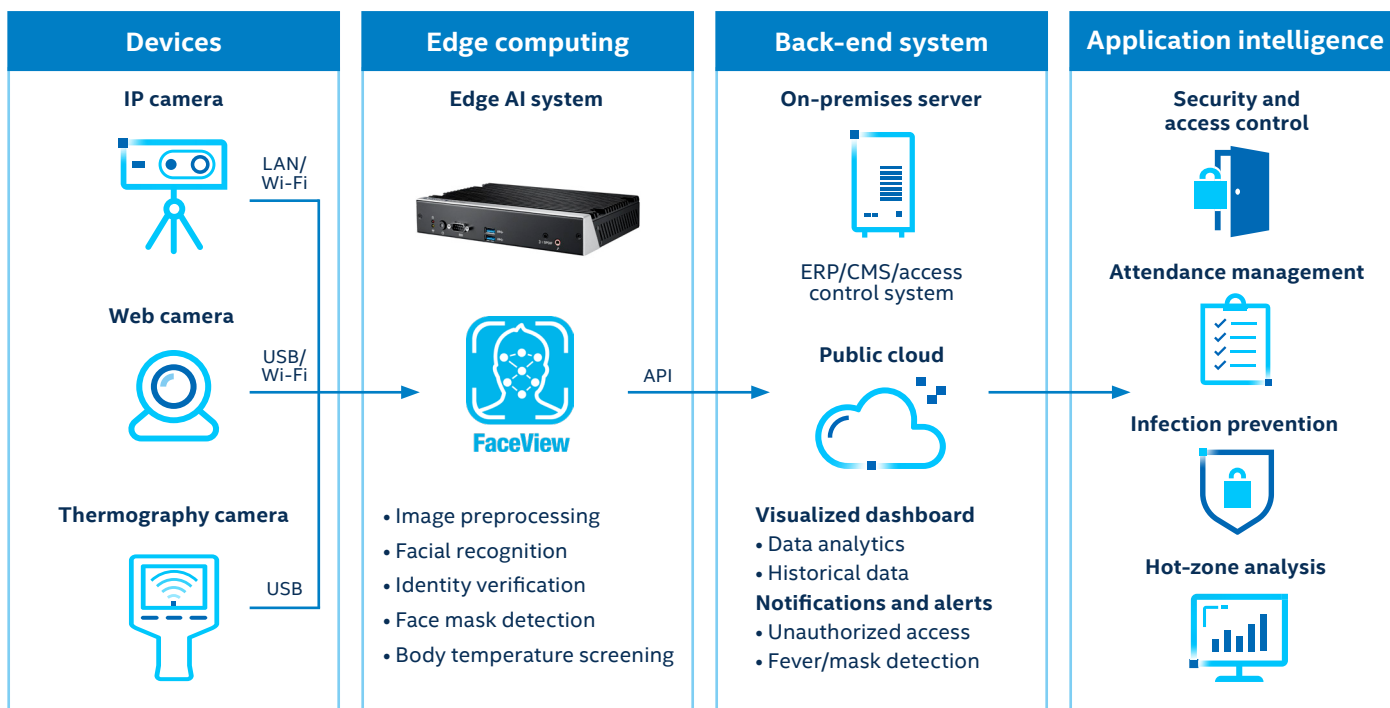


Figure 1: The FaceView data workflow from cameras, to edge AI system, to edge server, or private cloud network.

Software structure and AI acceleration with CyberLink FaceMe®

FaceView software offers cross-platform OS support for Windows 10 and Linux systems, and users can expand system capabilities with a number of add-in APIs for visitor monitoring, webcam streaming, customer program enrollment, and more. But the real heart of the solution, its AI engine, is driven by the CyberLink FaceMe® SDK. Kao comments, “Advantech tested and validated FaceMe® for the FaceView solution. The FaceMe® SDK is fully integrated with

Intel® Movidius™ VPUs and the Intel Distribution of OpenVINO toolkit. It helps deliver strong performance and low CPU loading for characteristic recognition processes.” FaceMe® takes advantage of the Intel Distribution of OpenVINO toolkit to optimize visual recognition workloads, which enables a 5.4x acceleration in AI vision performance² and makes the total solution much more powerful and cost-effective as an edge AI device deployment.

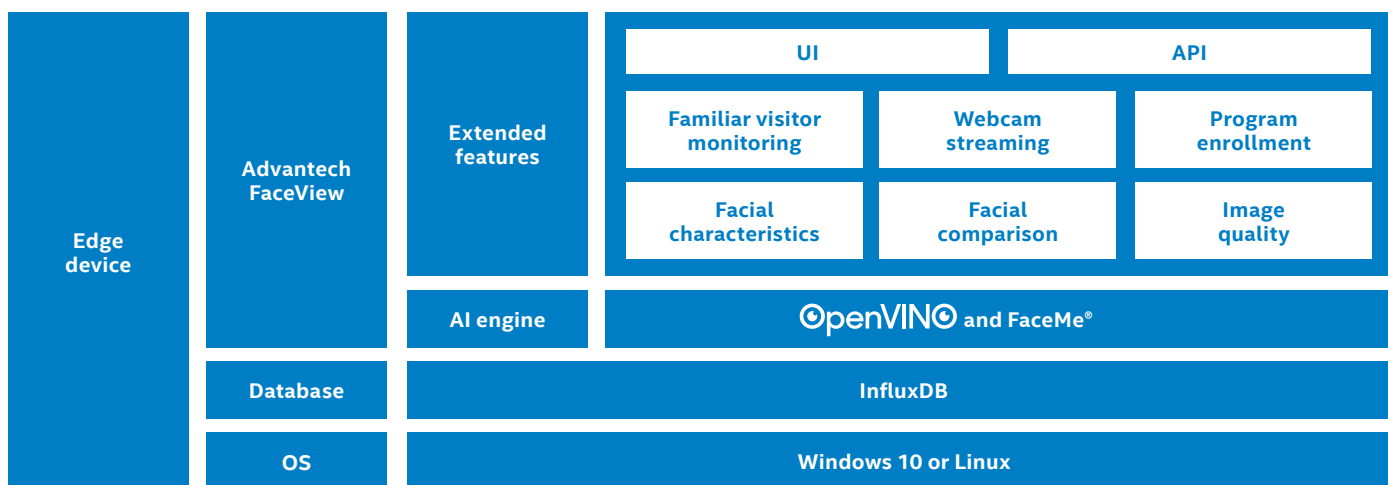


Figure 2: The complete FaceView software stack, with an AI engine powered by CyberLink FaceMe®.

Antispoofing measures for more secure visual recognition

The FaceMe® SDK also leverages the capabilities of Intel® RealSense™ technology to generate and process highly accurate points of depth measurements on visual objects. This enables the FaceView solution to not only be more accurate on recognizing familiar objects, but also enables

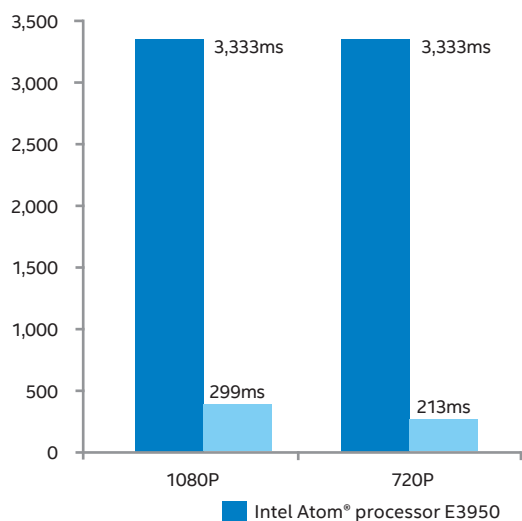
it to detect spoofing attempts or false positives, as in the case of a subject trying to fool a camera or sensor with a flat image or video of a known object. According to measurements by CyberLink, the SDK has a 100 percent detection rate for spoofing attempts.²

Hardware optimization with a massive speed boost

Advantech chose a combination of the Intel Atom processor E3950 and the Intel Movidius Myriad X VPU for its edge AI system. Within this configuration, the Intel Atom processor provides a just-right fit in terms of CPU processing power, while the Intel Movidius Myriad X VPU is purpose-built for AI vision and object recognition workloads. According to Kao, “We wanted to reduce the deployment difficulty. The Intel Atom processor E3950 provides just enough CPU power in floating-point arithmetic, while staying cost-effective in combination with the Intel Movidius Myriad X VPU.”

With this setup, Advantech was able to demonstrate a 10x acceleration in visual recognition workloads for systems that used both an Intel Atom processor and Intel Movidius Myriad X VPU, compared to systems with just an Intel Atom processor.³ And, the inclusion of the Intel Movidius Myriad X VPU also delivers a 30 percent reduction in total CPU usage, resulting in a more-efficient and less-power-hungry system overall.³ For system integrators and end users, the total cost of an Advantech system also goes down, making it more cost-effective to deploy or scale up with multiple systems.

Recognition speed: 10x faster



CPU usage: 30% reduction

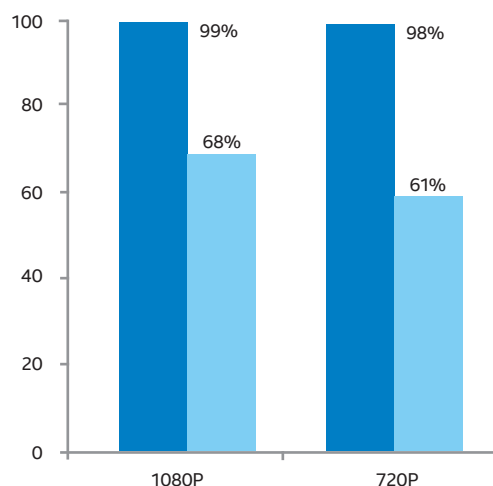


Figure 3: Demonstrated benefits of Advantech systems with both an Intel Atom® processor and an Intel® Movidius™ Myriad™ X VPU.³

See backup for workloads and configurations. Results may vary.

Multiple entry points and ease of deployment

Advantech offers multiple entry points for their FaceView solution, with different accompanying edge AI appliances that scale up visual processing power by adding more Intel Movidius Myriad X VPUs to an internal proprietary module called the Advantech VEGA. For low-performance use cases, such as an interactive kiosk in a retail setting, system integrators can deploy a basic appliance with just

one VPU. For more-advanced use cases, such as intelligent transportation, Advantech also offers a temperature-resistant edge appliance with up to four VPUs. And this is just a snapshot of potential offerings; the full Advantech portfolio is extensive and covers many use cases, with the option to customize solutions based on environmental or AI vision compute needs.



Advantech AIR-100

- Multi-4K display
- Cost sensitive
- VEGA-320 module (1x VPU)



Advantech AIR-101

- Compact design
- Low power
- VEGA-320 (1x VPU)



Advantech AIR-200

- Extended temperature threshold
- Multichannel processing
- VEGA-330 (4x VPUs)

Figure 3: Multiple entry points make it easy for system integrators to select the best system for more-demanding AI vision workloads.

Simple user experience to help engage end customers and employees

The key competitive advantage here is just how quickly a system integrator can select an appliance, connect it to edge AI cameras and back-end cloud networks, and start delivering visual recognition services for their customers. The FaceView user interface also makes it easy to manage an entire database of registered end customers or participants

on an opt-in basis, while generating useful CRM-oriented data to help understand key behaviors. For example, in a retail setting, FaceView users can see when customers last visited a store location, add them to VIP groups to help prioritize service delivery, or even differentiate between customers and employees on the sales floor.

CUSTOMER NAME	GROUP	LAST VISIT TIME	NOTIFICATION	ACTIONS
Gary Lin	VIP	2020-03-10 13:41:55	<input type="checkbox"/>	
Geen Li	Employee	2020-03-10 13:43:50	<input type="checkbox"/>	
Mary Chen	Employee	2020-03-10 13:46:27	<input type="checkbox"/>	
Wendy Lin	VIP	2020-03-10 13:48:05	<input type="checkbox"/>	
John Lee	VIP	2020-03-10 13:48:50	<input type="checkbox"/>	
Kylie Li	Employee	2020-03-10 13:49:10	<input type="checkbox"/>	
15 15	VIP	2020-03-10 13:50:13	<input type="checkbox"/>	

Advantech FaceView with the CyberLink FaceMe® SDK and Intel® Movidius™ Myriad™ X VPUs

99.7%
accuracy¹

10x
faster visual
recognition³

30%
lower CPU
usage³

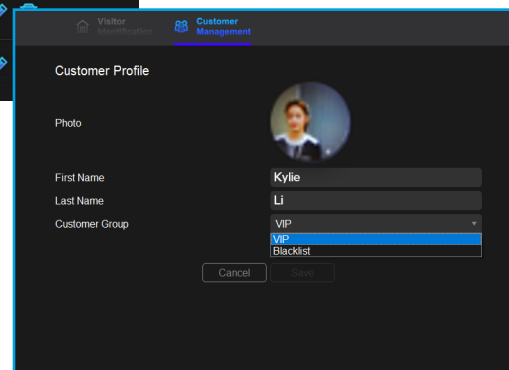


Figure 5: A screenshot of the FaceView user interface, showing customer-relationship data.

Flexible AI vision for multiple scenarios

The Advantech FaceView solution is a versatile addition to any system integrator portfolio of offerings and helps ensure quick deployment, time to value, and ease of use for businesses. FaceView offers substantial performance and efficiency for visual recognition with its inclusion of the industry-recognized CyberLink FaceMe® SDK. Advantech designs its hardware configurations with the ideal combination of Intel Atom processors with Intel Movidius Myriad X VPUs to deliver power-efficient performance that's optimized for vision AI workloads. The net result of these technologies and efforts is a simple yet powerful facial object recognition solution that businesses can now access.

Learn more

Advantech FaceView

The Advantech FaceView solution is a comprehensive software stack built with the CyberLink FaceMe® SDK for efficient characteristic recognition workloads and supports multiple deployment scenarios.

[Learn more ›](#)

CyberLink FaceMe®

The CyberLink FaceMe® SDK is recognized throughout the industry as a high-precision visual recognition AI engine that uses key optimizations in the Intel Distribution of OpenVINO toolkit.

[Learn more ›](#)

Intel Distribution of OpenVINO toolkit

AI developers can use the Intel Distribution of OpenVINO toolkit to optimize and accelerate key AI vision workloads on Intel® hardware.

[Learn more ›](#)

About Advantech

A global solution provider in embedded and automated solutions, Advantech is enabling businesses with more intelligent systems for a more intelligent planet.

advantech.com

About CyberLink

CyberLink is a world leader in multimedia software and AI facial object recognition technology, driving business value from easy-to-use and efficient tools.

cyberlink.com



1. Source: NIST March 2020 Wild FVRT 1:1 test result measured for the CyberLink FaceMe® SDK.

2. Source: Internal CyberLink performance data.

3. Source: Internal Advantech performance data. Primary configuration is built with an Intel Atom® processor E3950, vs. a system built with an Intel Atom processor E3950 and an Advantech VEGA-320 module with an Intel® Movidius™ Myriad™ X VPU.

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