

Solution Brief

Edge AI Analytics
Digital Safety and Surveillance

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Intel-Powered AI from Camect Improves Alert Usefulness by Making Security Cameras Smart

Built with Intel® NUCs and the Intel® Video AI Box development package, Camect delivers high accuracy for security camera AI analytics



The smart camera market is undergoing unprecedented growth driven by advances at the silicon level, with a forecasted compound annual growth rate (CAGR) of 25.8 percent to reach a valuation of USD 151M through 2032.¹ High computational performance at the edge means that solution providers can condense powerful AI analytics that match the performance of cloud-powered AI into smaller devices while avoiding the added networking costs and privacy concerns of sending data to the cloud for processing.

"We chose Intel® NUCs and Intel® AI Box software because they form a standardized, well-documented platform with worldwide availability and flexible processing power and price options that serve our entire range of use cases. They're an excellent base for us to build on and well known to a wide range of vendors and solution providers."

—Arup Mukherjee, President and Co-Founder, Camect

Challenge: Smart cameras are not smart enough to be effective

Both demand and interest in smart camera solutions are growing across horizontal industries—such as logistics, construction, manufacturing, and energy—as well as across business and residential customers. The rise in security cameras lacking in intelligence has led to an overabundance of useless alerts, alert desensitization among users, and fatigue. This has opened the market up for innovative solutions that improve alert quality. Solution providers are facing a massive opportunity, but AI analytics for smart cameras can be complex and difficult to deploy, especially so for businesses that lack expertise in AI IoT solutions. To avoid getting left behind, solution providers need an easy, scalable, and globally available supply of turnkey devices that work with existing digital safety and surveillance infrastructures.



Figure 1: Camect Smart Camera Hub, powered by Intel, offers superior object and motion detection in darkness, over distance, and through distractions.

Solution: Intel® NUC-powered Camect solutions provide trust, ease, and scalability

Camect video analytics solutions—powered by Intel® hardware—offer flexible, easy-to-use video analytics with exceptional detection quality. The Camect Smart Camera Hub is capable of detecting a wide range of events with no more than 1 percent false alerts.² Camect is also highly cost-effective compared to other solutions. It provides a complete network-managed camera platform, including recording and playback, in a small form factor.

The Camect solution uses Intel® NUC devices, Intel® processors, and the Intel® Video AI Box development package with the Intel® Distribution of OpenVINO™ toolkit to bring AI intelligence to existing digital surveillance applications. Solution providers and end users simply connect one or more Camect Smart Camera Hubs—delivered in the form factor of an Intel NUC with preconfigured hardware and software—to the network. It's that easy.

Intel and Camect have collaborated on a ready-to-go solution that works with existing cameras and services. "We chose Intel NUCs and Intel AI Box software because they form a standardized, well-documented platform with worldwide availability and flexible processing power and price point options that serve our entire range of use cases. They're an excellent base for us to build on and well known to a wide range of vendors and solution providers," says Arup Mukherjee, President and Co-Founder of Camect.

How it works

Built on the trusted Intel NUC platform, Camect Smart Camera Hubs are compatible across many internet protocol (IP) camera solutions and include support for ONVIF and Real-Time Streaming Protocol (RTSP) standards that are common to security cameras. Within a Camect configuration, the Intel NUC device will connect to a customer's network, automatically discover cameras on the network, and connect to them with the user's permission. All video retrieval and all analysis, including AI analytics, take place within the local network, reducing the need for additional infrastructure.

By offering a range of Intel processors, Camect is able to meet the needs of a wide range of video analytics systems. Camect and Intel allow solution providers to scale processing power and price in order to rightsize their solution to meet customers' needs—from systems with many cameras to those with just a few. A typical deployment with a 10th Gen Intel® Core™ i3 processor can support up to 60 megapixels of total camera resolution for home security usage, whereas a typical deployment with an 11th Gen Intel® Core™ i5 processor can support up to 96 megapixels.³ It's important to note that common HD cameras have two megapixels of video resolution and 4K cameras have up to eight megapixels of resolution, so even an entry-level solution can support multiple cameras. "Camect is especially strong for businesses that manage larger fleets of small installations," Mukherjee says. "Think cell towers, cable plants, electric substations. Intel NUCs can provide coverage for multiple cameras at each site, and the Camect platform provides central management and alerts for all of them."

The globally available, deployable-anywhere Intel NUC

Intel NUCs are a cornerstone of the Camect solution. Not only does the Intel NUC device provide trusted and standardized hardware to work with, but the small form factor is extremely flexible and can be deployed virtually anywhere in a commercial environment. For deployments in outdoor or industrial environments with harsh conditions, ruggedized options are available. Most importantly, Intel NUC hardware is available globally, giving Camect an edge in providing consistent smart camera hubs and postdeployment support to businesses all over the world.

"Intel NUC standardization makes a huge difference for technical support. If customers experience issues, we can diagnose them quickly because we know exactly what's in the system and what the BIOS looks like," says Mukherjee.



Figure 2: The Intel-powered Camect Smart Camera Hub is designed to integrate seamlessly with a user's existing video surveillance network.

Exceptional cost per performance with Intel processors

Camect chose Intel processors because the integrated GPUs (iGPUs) support AI workloads without the need for an external GPU, which would have driven up costs that would have to be passed on to customers. “Intel also provides robust documentation and access to its iGPUs compared to other chipmakers, so the platform is extremely developer friendly,” Mukherjee says. Camect notes that not only do they have an easier time tuning workloads for the iGPU but ISVs will enjoy a similar level of ease and access to help optimize their own software on Intel hardware.

Multiple entry points, from Intel® Celeron® processors to Intel Atom® and Intel® Core™ processors, mean that end customers can easily rightsize the Intel NUC’s performance levels to the number of cameras and video streams they need to support at any given location. An Intel Celeron processor, for instance, prioritizes cost efficiency and is a great fit for smaller installations with lower-resolution cameras. But if customers want to capture all activity in the highest possible detail while still maintaining headroom for more resolution and more cameras, they can ladder up to an Intel® Core™ i7 processor to maximize their compute and analytics power.

Fast AI and video processing with the Intel Video AI Box development package

In creating their proprietary software solution, Camect used Intel® toolkits from the Intel Video AI Box development package to improve the efficiency of AI and video processing. These toolkits included the Video Acceleration API (VA-API), which is hardware-supported on select Intel processors and accelerates encoding/decoding for MPEG-2 and H.264 video streams. Camect also used the Intel® oneAPI Math Kernel Library (Intel® oneMKL) and Intel Distribution of OpenVINO toolkit to boost AI inference efficiency and make full use of iGPUs, without requiring extra time or effort to optimize AI models for specific hardware.

“The OpenVINO™ toolkit makes it easier to upgrade from one processor generation to the next with zero to minimal changes to the AI models and application software,” Mukherjee says. OpenVINO allows the Camect Smart Camera Hub to run on a wide range of processors with integrated GPUs without changing their AI models and with only minor changes to the software. The platform flexibility afforded by the OpenVINO toolkit extends to peripherals as well. For example, Camect can boost the AI capabilities of an Intel NUC by adding in an Intel® Neural Compute Stick 2 (Intel® NCS2). This module plugs into the back of an Intel NUC over a standard USB 3 Type A port and boosts AI inference performance with no additional software configuration required.



Delivery trucks recognized by logo



Person detected

Figure 3: Intel-optimized AI in the Camect solution quickly and accurately detects objects while preventing false positives from shadows, weather, and wildlife.

Cost-effective and cloud manageable

With an innovative and easy-to-use set of offerings that could complement any solution provider portfolio, Camect is already making an impact for businesses with emerging use cases such as Monitored Video as a Service. “Our goal is to empower solution providers, and Intel® technology helps us do just that. We want to help businesses explore their ingenuity and develop new use cases that the market hasn’t seen yet,” Mukherjee says. Camect differs from traditional digital safety solutions by answering the questions, “What interesting events are occurring right now, and what’s the most efficient way to notify the people who need to respond to those events?”

Fewer than 1 percent incorrect detections²

Powerful analytics from the Camect Smart Camera Hub reliably deliver accurate notifications of interesting activity observed by security cameras. The precision of the solution’s proprietary, Intel-optimized AI models effectively eliminates overwhelming, costly, useless, and false detections known to limit the usability of other security camera AI analytics products. Field deployments of the Camect Smart Camera Hubs consistently demonstrate high performance represented by almost never missing activity information deemed useful and interesting. Camect flags activity that is legitimately interesting over 99 percent of the time.² This means fewer than 1 percent of alerts result from irrelevant activity (e.g., moving shadows, lights, rain, snow, and wind) or from incorrect classifications, such as detection of wildlife when a user only desires to be informed of the presence of people or cars. This precise detection also occurs while respecting the privacy of users and customers, as Camect Smart Camera Hubs do not recognize or track individuals.

Alerts from anywhere

Cloud-manageable recording and analysis-producing alerts is the core value proposition of Camect. Regular users can receive alerts that feature video clips—shortened and time-stamped by AI for relevancy—over the Camect phone app, email, or instant message services. Professional users may use popular security platforms, including Immix, Sentinel, and DICE. Camect also provides APIs for professional monitoring services that want to feed alerts into a custom backend.

An intelligent approach to video data storage

Video data storage is a challenge for digital safety solutions. Typical HD cameras can generate approximately 10 TB of data per year, with about 1 TB of data translating to 35 days of recorded footage, depending on resolution and other factors. However, the Intel® AI-powered Camect Smart Camera Hub solution stores data more efficiently than other systems. Because the platform intelligently identifies key events, it can differentiate and store low-value footage at lower fidelity to save storage space. The use of AI-filtered video clips within activity alerts also reduces the need to fetch data from storage, as the most interesting events are already cataloged for user review.

Camect stores all data at the edge, within the Intel NUC device. This reduces network infrastructure and bandwidth needs while also helping reduce a business’s attack surface and risk of loss or breach for potentially sensitive video data. If users or businesses do need extensive archiving, such as to meet regulatory requirements, they have the option to add more hard drives or network-attached storage (NAS) to the network or directly to the Intel NUCs over a USB connection.

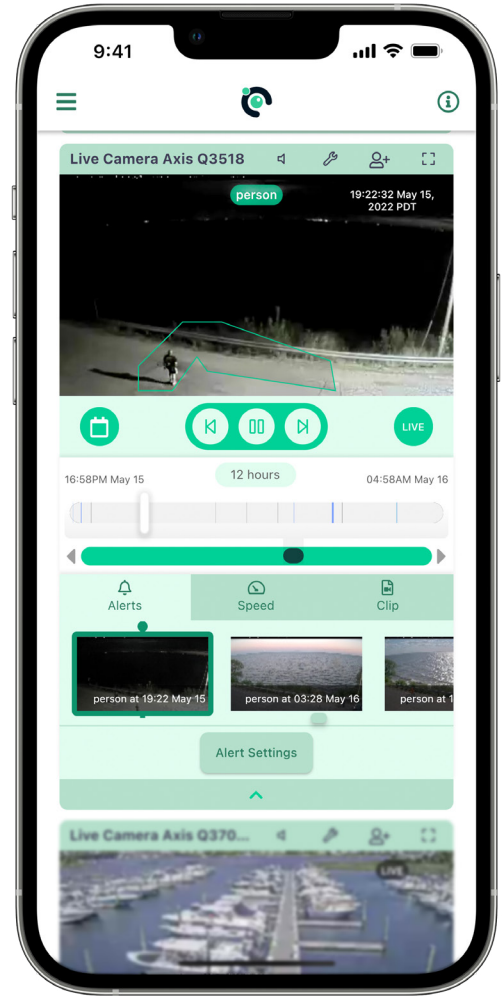


Figure 4: The Camect mobile app notifies users with alerts and video clips, filtered by Intel-optimized AI for relevancy.

Conclusion: Innovative AI solution improves security camera usefulness

Powered by Intel processors and Intel toolkits, the Camect Smart Camera Hub fills the growing market gap between security camera users and the AI technology needed to make security camera alerts useful. The Intel NUC form factor, trusted worldwide, enhances the Camect offering of high-powered analytics. This results in reliability of security alert accuracy and ease of use to deliver an affordable win to customers across global commercial and residential industries.

Learn more

Camect solutions

Read more about the Intel and Camect collaboration at camect.com/intel.

Start your journey and reach out to Camect at camect.com/contact.

Intel technology

Discover the value of [Intel processors for IoT and embedded applications](#).

Explore the capabilities of the [Intel Distribution of OpenVINO toolkit](#).

See how businesses succeed with [Intel NUC for edge compute use cases](#).

Learn more about Intel-enabled [computer vision technology and solutions](#).

About Camect

Based in Silicon Valley, Camect is creating the simplest and most useful security solutions from ordinary camera installations in homes and businesses. Camect was founded by former Google employees, computer scientists, and security industry veterans who are developing best-in-class AI to redefine the security camera experience.

camect.com



1. "Smart Camera Market Share to Thrive at a CAGR of 25.8% during the forecast period 2022-2032 | Future Market Insights, Inc.," GlobeNewswire, August 16, 2022, globenewswire.com/news-release/2022/08/16/2499337/0/en/Smart-Camera-Market-Share-to-Thrive-at-a-CAGR-of-25-8-during-the-forecast-period-2022-2032-Future-Market-Insights-Inc.html.
2. Source: Camect internal measurements. See camect.com/security-camera-installation for more information.
3. Internal estimations provided by Camect. Capacity recommendations are provided based on satisfactory performance in customer deployments. System load will vary based on the amount of activity being observed by the cameras. Highly active scenes increase the workload and result in a decrease of the total camera resolution that can be served on any particular processor.

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