PICTURE PERFECT: FACILITATING HIGHER RESILIENCE FOR MACHINE VISION CAMERAS

FANLESS EMBEDDED BOX PC WITH 6TH/ 7TH GENERATION INTEL® CORE™ DESKTOP PROCESSOR AND POE

CAMERA TECHNOLOGY OFFERS VARIOUS HACKS SUCH AS AUTOMATIC DETECTION, ULTRA-SMOOTH MOTION, HIGH LEVELS OF PRECISION AND SILENT OPERATION, AS WELL AS SEAMLESS USER INTERFACE INTEGRATION AND EASIER ACCESS TO CONTROLS

BY VIVIEN WANG

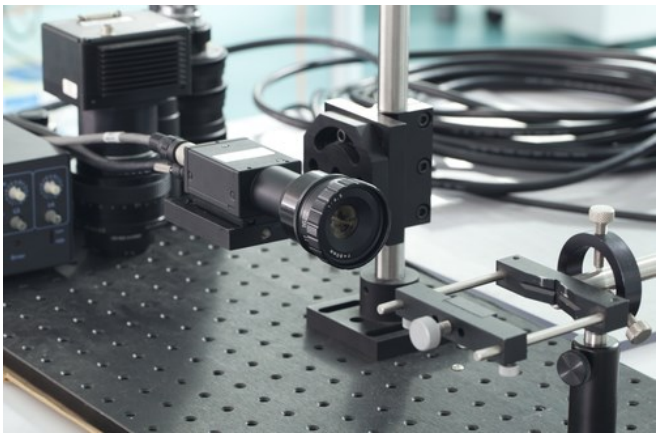
WITH Industry 4.0 filtering through every aspect of the machine-based industries, its application in cameras has been no shirking violet, and has been gaining steady traction over the past decade. A notable example is the usage of motion control sensors and smart systems in camera technology, which offer various hacks such as automatic detection, ultra-smooth motion, high levels of precision and silent operation, as well as seamless user interface integration and easier access to controls.

Motion control and detection is also one of the most important features in surveillance cameras. Embedded sensors within the cameras are able to pick up movements within the camera's view range, and some cameras support advanced features such as the ability to detect heat sources and the number of people within camera range. Due to the ubiquity of sensory movement, however, it is of equal importance that the system provide filters to distinguish or narrow down the range of sensory data detected. For such fine-tuned precision, it is imperative to consolidate cameras with architecture capable of supporting, powering and connecting all relevant components in a durable and flexible design.

CHALLENGES

The client had developed a machine vision application which would be able to scan the entire body and record body measurements, then select and recommend suitable outfits for the customer. The apparatus used were industrial-grade, high-res cameras that produced 30 frames per second, and provided 360 degrees, full body imaging scans.

Our client wished to find a suitable platform to encompass the many and varied systems and subsystems of their motion sensor cameras, which would be able to support a tightly controlled and synchronized interface. The cameras had to provide seamless and high-res display output without losing frame integrity or compromising resolution. Additionally, the CPU needed to come with a heat



dissipating solution, as it would be providing real-time HD imaging processing and data analysis, and a suitably stable environment was required in order to facilitate smooth CPU engagement.

The client also required a wider range of LAN ports than was available on the current market, as they wished to connect more cameras for maximum security input, whilst simultaneously sending the information back onto the cloud so that the system would be able to collate and accurately provide suitable clothing suggestions for the customer.

SOLUTIONS

AAEON's engineers implemented the BOXER-6639M, a compact fanless box-shaped mini PC that is powered by the 6th/ 7th Generation Intel® Core™ Desktop Processor and the latest Kabylake/Skylake. The BOXER-6639M's features included a desktop-grade socket type processor with longevity support and high-resolution graphic displays, which provided a formidable platform that was more than capable of consolidating and processing the hefty input of imaging data leveraged by the client's 9 high-res cameras. Additionally, the BOXER-6639M came with an internal storage capacity of up to 32 GB of DDR4 ECC or Non-ECC SODIMM support. It is also designed for a wide range voltage input of 12-36V. Working samples of the BOXER-6639M were provided for the client to perform field runs during the early stages of collaboration, so that the client could judge whether the BOXER-6639M would be the best choice for their systems, and test interoperability, stability and functionality. Once the client was satisfied that the BOXER PCs were indeed the best platform for their machine vision cameras, the units were deployed.

THE BOXER-6639M SUCCESSFULLY MITIGATED THE CPU DILEMMA OF OVER-HEATING WITH AAEON'S UNIQUE FANLESS SOLUTION, FACILITATING SWIFT COOLING AND SPEEDY HEAT DISSIPATION

HIGHLY EFFICIENT THERMAL MANAGEMENT

The BOXER-6639M successfully mitigated the CPU dilemma of over-heating with AAEON'S unique fanless solution, facilitating swift cooling and speedy heat dissipation, and providing the added bonus of being able to operate at maximum capacity even under environmental extremes such as long, hot summers. Additionally, the CPU is cased within the BOXER-6639M's improved casket-lid design, which allows the users to open the mini PC via a lid at the top, and easily access the components within.

The client can therefore inspect and maintain the inner architecture at their discretion and convenience without having to take the mini PC back to the manufacturer for lugubrious and superfluous maintenance. This lid design also enables the client to perform basic diagnostics and troubleshooting without the hassle of having to apply for factory support and maintenance, thus lowering time and R&D costs.

The CPUs are designed to be swappable, which are a far more economic and efficient option than their industrial-grade counterparts. The BOXER-6639M itself caters to a wide temperature range, and operates from -25°C ~ 55°C, with a storage temperature range of -45°C ~ 80°C.

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NAVIGATING VAST SWATHES OF INFORMATION IN THE BLINK OF AN EYE

With the BOXER-6639M, the client was able to ensure that their cameras could scan, collate and classify more than a hundred frames per minute. The information collected was then sent back to a database and processed via algorithms, with a marginal error of less than 0.5 %.

“Fundamentally, what machine vision does is to essentialize the physical structure of objects that we perceive, minus the human error factor, and in a tithe of the time it would have taken to process this data manually,” said Ken Pan, senior product manager for AAEON’s System Platform Division. “In a broader context, the Machine Vision series provides longevity support and a customizable mechanical design to meet the ever-changing needs of both the client and the landscape of Industry 4.0, and can be adapted for a wide range of industrial manufacturing processes, lowering lead time and enhancing efficiency and accuracy.”

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– KEN PAN, SENIOR PRODUCT MANAGER, SYSTEM PLATFORM DISIVION

IMMEDIATE TROUBLESHOOTING AND SWIFT MITIGATION

One would be hard-pressed to find any person who enjoys being put on hold for a customer service agent who may or may not pick up your call, whilst saccharine company music plays ironically in the background. AAEON’s engineers and all after-sales personnel are conditioned for speed, and schooled to respond immediately to any queries the client might have, technical or otherwise. “People want what they need, and fast” explains Roy Huang, product manager for AAEON’s System Platform Division. “Speed and the ability to rise immediately to the occasion is a competitive strategy that separates AAEON, and gives us an additional edge, as we always prioritize our customers and their needs. We realize that time is itself a currency, and the fastest solution provider is going to be the vendor that clients come to.”

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IMPACT

By selecting AAEON's mini PC, the client was able to consolidate and maximize their camera network, facilitating seamless machine vision for their products and delivering to their own customers well before schedule. With the advent of the Internet of Things (IoT) and the automation of processes, companies are increasingly turning to smart manufacturing as viable and time saving precision solutions. Machine vision and digital imaging and modelling will only go forward from this point, and with it, the accompanying architecture and platforms needed to buttress the mileage it wields.

REFERENCES

Vision-systems.com. (2017). *By any other name*. [online] Available at: http://www.vision-systems.com/articles/print/volume-15/issue-10/Departments/Inside_Vision/by-any-other-name.html [Accessed 1 Aug. 2017].

ABOUT AAEON

Established in 1992, AAEON is one of the leading designers and manufacturers of professional intelligent IoT solutions. Committed to innovative engineering, AAEON provides reliable and high quality computing platforms, including industrial motherboards and systems, industrial displays, rugged tablets, embedded controllers, network appliances and related accessories, as well as integrated solutions. AAEON also has the hardware and services for premier OEM/ODMs and system integrators, worldwide. Being an Associate Member of the Intel® Internet of Things Solutions Alliance, AAEON offers customized end-to-end services from the initial product conceptualization and board product development to mass manufacturing and after-sales service programs. AAEON is also a GSA government contract holder (#GS-35F-0470Y) serving Federal, State & Local government sectors. Peruse AAEON's expansive line of products and services by visiting www.aaeon.com.