Ambarella Introduces CV5 High Performance AI Vision Processor for Single 8K and Multi-Imager AI Cameras

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Ambarella's new 5 nm CV5 AI vision CVflow ® processor sets a new standard for power efficiency with 8K video recording in under 2 watts

SANTA CLARA, Calif.--(BUSINESS WIRE)--Jan. 11, 2021-- Ambarella, Inc. (Nasdaq: AMBA), an AI vision silicon company, today unveiled CV5, an artificial intelligence (AI) vision processor capable of recording 8K video or four 4K video streams. The new system on chip (SoC) will enable the development of intelligent automotive camera systems, consumer cameras (drone, action, and 360°), and robotic cameras. It combines Ambarella's powerful CVflow AI engine with dual Arm® A76 CPUs to provide the performance necessary for a wide range of AI-based algorithms. Its advanced image signal processor (ISP) can simultaneously process images for both human viewing and machine processing. Fabricated in advanced 5 nm process technology, CV5 consumes under 2 watts of power while encoding full 8K video at 30 frames per second.

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Ambarella today unveiled the CV5 AI vision CVflow® 5 nm processor for single 8K and multi-imager AI cameras, setting a new standard for power efficiency with 8K video recording in under 2 watts. The SoC targets intelligent automotive camera systems, consumer cameras (drone, action, and 360°), and robotic cameras. (Photo: Business Wire)

"With the introduction of CV5, Ambarella is defining the next generation of automotive, consumer, and robotic cameras," said Fermi Wang, CEO of Ambarella. "By combining 8K single-channel and 4K multi-channel recording with the high performance of our CVflow AI engine, we are enabling cameras with the highest-quality imaging and innovative new AI features."

In automotive video telematics applications, CV5 provides the performance necessary to encode multiple video streams from front ADAS, driver monitoring, cabin monitoring, and side-view cameras. Its CVflow AI engine can simultaneously run advanced driver assistance systems (ADAS) algorithms such as lane departure, and forward collision warning as well as driver monitoring algorithms such as drowsy driver detection. The combination of high-resolution video capture with advanced AI processing enables ADAS cameras to recognize images over long distances and with high accuracy.

The exceptionally low power consumption of the CV5 SoC also makes it an ideal solution for the next generation of high resolution and high frame-rate action, 360°, and virtual reality (VR) cameras, offering 8K recording and playback in very small form factor designs.

In robotic and drone applications, CV5's CVflow AI engine can accelerate simultaneous localization and mapping (SLAM), path planning, and obstacle detection, and avoidance algorithms for navigation and autonomous operation. For drone-based aerial videography and cinematography, CV5 can simultaneously perform flight control and navigation functions while recording up to 8K resolution video recording at 60 frames per second.

The CV5 SoC shares common SDK and computer vision (CV) tools with Ambarella's other CVflow SoC families, simplifying development of cameras with multiple price and performance options. A complete set of CV tools helps customers port their own neural networks onto CV5, including a compiler, debugger, and support for industry-standard machine learning frameworks, such as PyTorch ™, ONNX ™, Caffe ™, and TensorFlow ™, as well as extensive guidelines for convolutional neural network (CNN) performance optimization.

CV5 SoC key features:

- CVflow architecture with DNN support
- Dual-core Arm® Cortex®-A76 up to 1.6 GHz with NEON™ DSP extensions and FPU
- High-speed SLVS-EC, MIPI-CSI (C/D PHY) interfaces, connecting up to 14 cameras
- Multi-channel ISP with up to 8KP60 throughput
- Native support for RGGB, RCCB, RCCC, RGB-IR, and monochrome sensor formats
- Multi-exposure high dynamic range (HDR) processing
- Real-time, hardware-accelerated fisheye dewarping and lens distortion correction (LDC)
- AVC and HEVC encoding with up to 8KP60 throughput and multiple stream support
- Rich set of interfaces includes 4-lane PCIe, CAN FD, Gigabit Ethernet, USB 3.1 host and device, three SD card controllers, MIPI DSI/CSI-2 and HDMI video outputs
- LPDDR4x / LPDDR5 / LPDDR5x support, 64-bit data bus and up to 32 GB capacity
- Advanced security features, including secure boot with TrustZone® and secure memory, TRNG, OTP, DRAM scrambling and virtualization
- 5 nm process technology

- 16x16 FBGA package with 0.5 mm ball pitch

About Ambarella, Inc.

Ambarella's products are used in a wide variety of human and computer vision applications, including video security, advanced driver assistance systems (ADAS), electronic mirror, drive recorder, driver/cabin monitoring, autonomous driving, and robotic applications. Ambarella's low-power system on chips (SoCs) offer high-resolution video compression, advanced image processing, and powerful deep neural network processing to enable intelligent cameras to extract valuable data from high-resolution video streams. For more information, please visit www.ambarella.com

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