News Release

For more information:
Neil Trevett, President, Khronos | ntrevett@nvidia.com | Phone: +1 (408) 464 7053

Khronos Releases OpenVX 1.1 Specification for High Performance, Low Power Computer Vision Acceleration

Expanded range of processing functions; Enhanced flexibility for data access and processing; Full conformance tests available; Safety Critical specification in development

May 2nd 2016 – Embedded Vision Summit, Santa Clara, CA – The Khronos™ Group, an open consortium of leading hardware and software companies, announces the immediate availability of the OpenVX™ 1.1 specification for cross platform acceleration of computer vision applications and libraries. OpenVX enables performance and power optimized computer vision algorithms for use cases such as face, body and gesture tracking, smart video surveillance, automatic driver assistance systems, object and scene reconstruction, augmented reality, visual inspection, robotics and more. Conformant OpenVX 1.0 implementations and tools are shipping from AMD, Imagination, Intel, NVIDIA, Synopsis and VeriSilicon. OpenVX 1.1 builds on this momentum by adding new processing functions for use cases such as computational photography, and enhances application control over how data is accessed and processed. An open source OpenVX 1.1 sample implementation and full conformance tests will be available before mid-2016. Details on the OpenVX specifications and Adopters Program are available at: www.khronos.org/openvx.

"More and more products are incorporating computer vision, and OpenVX addresses a critical need by making it easier for developers to harness heterogeneous processors for high performance, low power vision processing – without having to become processor experts," said ***Jeff Bier, founder of the Embedded Vision Alliance****. "This is essential for enabling the widespread deployment of visual intelligence in devices and applications."*

The precisely defined specification and conformance tests for OpenVX make it ideal for deployment in production systems where cross-vendor consistency and reliability are essential. Additionally, OpenVX is easily extensible to enable nodes to be deployed to meet customer needs, ahead of being integrated into the core specification.

The new OpenVX 1.1 specification is a significant expansion in the breadth and flexibility of vision processing functionality and the OpenVX graph framework:

- Definition and processing of Laplacian pyramids to support computational photography use cases;
- Median, erode and dilate image filters, including custom patterns;
- Easier and less error prone methods to read and write data to and from OpenVX objects;
- Targets - to control on which accelerator to run nodes in a heterogeneous device;
- More convenient and flexible API for extending OpenVX with user kernels;
- Many other improvements and clarifications to infrastructure functions and vision nodes.

About OpenVX

OpenVX abstracts a vision processing execution and memory model at a much higher level than general compute frameworks such as OpenCL, enabling significant implementation innovation and efficient execution on a wide range of architectures while maintaining performance portability and a consistent vision acceleration API for application development. An OpenVX developer expresses a

connected graph of vision nodes that an implementer can execute and optimize through a wide variety of techniques such as: acceleration on CPUs, GPUs, DSPs or dedicated hardware, compiler optimizations, node coalescing, and tiled execution to keep sections of processed images in local memories. This architectural agility enables OpenVX applications on a diversity of systems optimized for different levels of power and performance, including very battery-sensitive, vision-enabled, wearable displays.

Future Safety Critical Standards

Vision processing will be a vital component of many emerging safety critical market opportunities including Advanced Driver Assistance Systems (ADAS), autonomous vehicles and medical and process control applications. The OpenVX working group is developing OpenVX SC, a safety critical version of OpenVX for to address the unique and stringent requirements of these high reliability markets. The Safety Critical working group at Khronos is building on the experience of shipping the OpenGL® SC 2.0 specification for high reliability use of modern graphics programmable shader engines, and is developing cross-API guidelines to aid in the development of open technology standards for safety critical systems. Any interested company is welcome to join Khronos for a voice and a vote in these development processes.

OpenVX and Khronos APIs at Embedded Vision Summit, 2-4 May, Santa Clara, CA

There are multiple presentations and workshops related to OpenVX and other Khronos APIs on May 2nd-4th at the Embedded Vision Summit in Santa Clara, CA, including:

- NVIDIA VisionWorks, a Toolkit for Computer Vision using OpenVX at 3:15PM, Tuesday 3rd by NVIDIA
- Using the OpenCL C Kernel Language for Embedded Vision Processors at 3:45PM, Tuesday 3rd by Synopsys
- The Vision API Maze: Options and Trade-offs at 4:30PM, Tuesday 3rd by Khronos
- Programming Embedded Vision Processors Using OpenVX at 5PM, Tuesday 3rd by Synopsys
- Whole day hand-on workshop Accelerate Your Vision Applications with OpenVX on Wednesday 4th

Details about the Embedded Visions Summit are here: www.embedded-vision.com/summit and specific details on the Khronos full day OpenVX tutorial including speakers from AMD, Intel, Imagination, NVIDIA, Synopsis and TI are here: http://www.embedded-vision.com/summit/accelerate-your-vision-applications-openvx.

Industry Support for OpenVX 1.1

“AMD fully supports OpenVX with our open source release,” said **Raja Koduri, senior VP and chief architect, Radeon Technologies Group at AMD**. “We have enabled computer vision developers with access to OpenVX on the entire range of PC platforms, from embedded APUs to high-end workstation GPUs and the fully open source access also facilitates developers to port OpenVX to other platforms based on AMD GCN architecture easily.”

“OpenVX can be a valuable starting point for accelerating creation and adoption of vision applications, and can enable easier access to vision applications in safety-critical areas such as automotive and factory automation,” said **Chris Longstaff, director of business development, Imagination Technologies**. “Imagination is supporting OpenVX, development of the OpenVX SC specification and inclusion of important new features such as computational neural networks, across our PowerVR GPUs and vision IP offerings. These processors are at the heart of many of the world’s mobile, automotive and embedded devices, providing developers with ideal platforms to develop vision applications.”

"Vision processing is increasingly important for a range of real world applications. It is a fundamental technology for advanced driver assist systems and gesture recognition as a method of user interaction,” said **Mobica's CTO, Jim Carroll**. Mobica is excited to be working on the development of such applications and enabling acceleration technology for OpenVX 1.1 - we anticipate that it will be a fundamental technology for many aspects of next generation computing devices."

About The Khronos Group

The Khronos Group is an industry consortium creating open standards to enable the authoring and acceleration of parallel computing, graphics, vision, sensor processing and dynamic media on a wide variety of platforms and devices. Khronos standards include Vulkan™, OpenGL®, OpenGL® ES, WebGL™, OpenCL™, SPIR™, SPIR-V™, SYCL™, WebCL™, OpenVX™, EGL™, COLLADA™, and glTF™. All Khronos members are enabled to contribute to the development of Khronos specifications, are empowered to vote at various stages before public deployment, and are able to accelerate the delivery of their cutting-edge media platforms and applications through early access to specification drafts and conformance tests. More information is available at www.khronos.org.

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