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Microchip Teams Up with Intelligent Hardware Korea (IHWK) to Develop an Analog Compute Platform to Accelerate Edge AI/ML Inferencing

Using Microchip's memBrain™ nonvolatile in-memory compute technology and working with universities, IHWK is creating a SoC processor for neurotechnology devices

CHANDLER, Ariz., Sept. 13, 2023 (GLOBE NEWSWIRE) -- To address the rapid rise of Artificial Intelligence (AI) computing at the edge of the network and its associated inferencing algorithms, Intelligent Hardware Korea (IHWK) is developing a neuromorphic computing platform for neurotechnology devices and field programmable neuromorphic devices. Microchip Technology **(Nasdaq: MCHP)**, via its **Silicon Storage Technology (SST)** subsidiary, is assisting with development of this platform by providing an evaluation system for its **SuperFlash® memBrain™ neuromorphic memory solution**. The solution is based on Microchip's industry-proven nonvolatile memory (NVM) SuperFlash technology and is optimized to perform vector matrix multiplication (VMM) for neural networks through an analog in-memory compute approach.

The memBrain technology evaluation kit is designed to enable IHWK to demonstrate the absolute power efficiency of its neuromorphic computing platform for running inferencing algorithms at the edge. The end goal is to create an ultra-low-power analog processing unit (APU) for applications such as generative AI models, autonomous cars, medical diagnosis, voice processing, security/surveillance and commercial drones.

As current neural net models for edge inference may require 50 million or more synapses (weights) for processing, it becomes challenging to have enough bandwidth for the off-chip DRAM required by purely digital solutions, creating a bottleneck for neural net computing that throttles overall compute power. In contrast, the memBrain solution both stores synaptic weights in the on-chip floating gate in ultra-low-power sub-threshold mode and uses the same memory cells to perform the computations—offering significant improvements in both power efficiency and system latency. When compared to traditional digital DSP and SRAM/DRAM based approaches, it delivers 10 to 20 times lower power usage per inference decision and can significantly reduce the overall bill of materials.

To develop the APU, IHWK is also working with Korea Advanced Institute of Science & Technology (KAIST), Daejeon, for device development and Yonsei University, Seoul, for device design assistance. The final APU is expected to optimize system-level algorithms for inferencing and operate between 20-80 TeraOPS per Watt, which is the best performance available for a computing-in-memory solution designed for use in battery-powered devices.

“By using proven NVM rather than alternative off-chip memory solutions to perform neural network computation and store weights, Microchip’s memBrain computing-in-memory technology is poised to eliminate the massive data communications bottlenecks otherwise associated with performing AI processing at the network’s edge,” said Mark Reiten, vice president of SST, Microchip’s licensing business unit. “Working with IHWK, the universities and early adopter customers is a great opportunity to further prove our technology for neural processing and advance our involvement in the AI space by engaging with a leading R&D company in Korea.”

“Korea is an important hotspot for AI semiconductor development,” said Sanghoon Yoon, IHWK branch manager. “Our experts on nonvolatile and emerging memory have validated that Microchip’s memBrain product based on proven NVM technology is the best option when it comes to creating in-memory computing systems.”

Permanently storing neural models inside the memBrain solution’s processing element also supports instant-on functionality for real-time neural network processing. IHWK is leveraging SuperFlash memory’s floating gate cells’ nonvolatility to achieve a new benchmark in low-power edge computing devices supporting machine learning inference using advanced ML models.

For information contact **info@sst.com** or the appropriate regional contact listed on the **SST website**.

Resources

- Application Image: **www.flickr.com/photos/microchiptechnology/53134651376/sizes/l/**

About Silicon Storage Technology (SST)
Microchip Technology’s SST subsidiary is a leading provider of embedded flash technology. SST develops, designs, licenses and markets a diversified range of proprietary and patented SuperFlash memory technology solutions for the consumer, industrial, automotive and Internet of Things (IoT) markets. SST was founded in 1989, went public in 1995 and was acquired by Microchip in April 2010. SST is now a wholly owned subsidiary of Microchip and is headquartered in San Jose, Calif. For more information, visit the SST website at **www.sst.com**.

About Microchip Technology
Microchip Technology Inc. is a leading provider of smart, connected and secure embedded control solutions**.** Its easy-to-use development tools and comprehensive product portfolio enable customers to create optimal designs which reduce risk while lowering total system cost and time to market. The company’s solutions serve more than 125,000 customers across the industrial, automotive, consumer, aerospace and defense, communications and computing markets. Headquartered in Chandler, Arizona, Microchip offers outstanding technical support along with dependable delivery and quality. For more information, visit the Microchip website at **www.microchip.com**.

About IHWK
IHWK, headquartered in Korea, is a leading provider of AI (Artificial Intelligence) solutions using nano-device and NVM-emerging memory technologies. For more information, please visit the IHWK website at **www.intelligenthw.com/.**

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