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Sparse Artificial Intelligence MCU from Fertosense and ABOV Semiconductor Delivers Low-Cost, Low-Power AI-based Voice Processing to the Edge

AI-ADAM-100 AI MCU enables on-device “say what you mean” language processing and voice-cleanup capabilities for home appliances and other products

SAN BRUNO, California—July 17, 2024— Fertosense, in partnership with ABOV Semiconductor, today launched the AI-ADAM-100, an artificial intelligence microcontroller unit (AI MCU) built on sparse AI technology to enable on-device AI features such as voice-based control in home appliances and other products. On-device AI provides immediate, no-latency user responses with low power consumption, security, operational stability, and low cost compared to GPUs or cloud-based AI.

The AI-ADAM-100 integrates the Fertosense Sparse Processing Unit 001 (SPU-001), a neural processing unit (NPU), and an ABOV Semiconductor MCU to provide deep learning-powered AI voice processing and voice-cleanup capabilities on-device at the edge. With language processing, appliances can implement “say what you mean” voice interfaces that allow users to speak naturally and express their intent freely in multiple ways. For example, “Turn the lights off”, “Turn off the lights,” and “Lights off” all convey the same intent and are understood as such. Voice/audio cleanup processes data before it is sent to the cloud, improving reliability and accuracy while reducing the volume of data sent, thus reducing backend infrastructure costs.

“With sparsity integrated throughout the AI development stack, the AI-ADAM-100 is the first device on the market to fully unlock the advantages of sparse AI,” said Sam Fok, CEO, Fertosense. “Our sparsity-enabling technology allows our customers to deliver compact, efficient AI processing to a growing variety of markets and products, including home appliances as well as small form factor, battery-operated devices like high-fidelity hearing aids, industrial headsets, and consumer earbuds.”

On top of the AI-ADAM-100, Fertosense provides a highly customizable selection of AI-ADAM-100–based AI software application products—from full turnkey solutions to tool-driven applications or full custom implementations using a manufacturer’s own AI models, whether dense or sparse.



The Sparse AI Advantage

Sparse AI reduces the cost of AI inferencing by zeroing-out irrelevant portions of an algorithm and then only allocating hardware memory and compute resources to the remaining nonzero, relevant portions of the algorithm. A system that stores and computes only nonzero weights can deliver up to a 10x improvement in speed, efficiency, and memory footprint. Similarly, a system that computes only when a neuron's output is nonzero can deliver up to another 10x increase in speed and efficiency. Those 10s can multiply. Consequently, sparse AI enables manufacturers to implement deep learning-based AI models of up to 100x the power/complexity of previous MCUs without adversely impacting speed, efficiency, memory footprint, or performance.

While many edge applications can benefit from AI, they often lack the price or power flexibility to implement a GPU, cloud connectivity, or the volume to support a dedicated silicon solution. This has limited the adoption of edge AI. With the introduction of the AI-ADAM-100, manufacturers can implement voice language interfaces at the edge even for devices that are not connected to the cloud.

Many existing AI systems are always processing and consuming power even when the task is easy, like when the environment is quiet. Pure, cloud-based voice processing requires continuous throughput, leading to high infrastructure cost. The AI-ADAM-100 resolves tasks on-device to significantly reduce power and backend cloud loading. Specifically, the AI-ADAM-100 enables home appliance manufacturers to implement sophisticated wake-up and control functionality, allowing other system controllers and connectivity modules to drop into sleep mode and consume substantially less power when a user is not interacting with the system. This capability can be used to listen until a user's voice command is received, and then to either process the command on-device or wake the system to send the command to the cloud.

A Product of Partnership

FemtoseNSE and ABOV developed the AI-ADAM-100 MCU in strategic collaboration, leveraging the core strengths of each partner. "The AI-ADAM-100 is the best-optimized AI MCU solution for voice and audio-based AI applications and enables a variety of on-device AI applications for consumer electronics and standalone devices," said Choi Won, CEO of ABOV Semiconductor. "Together with FemtoseNSE, we will continue to develop the most cost- and power-efficient AI MCUs for global customers."

ABOV has verified AI-ADAM-100's top-notch voice command recognition performance under multiple noise conditions, meeting the requirements of leading customers. Global home appliance makers are working to reduce the number of buttons on their devices and streamline the user experience. AI-based voice command can accelerate this trend.

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Availability

Engineering samples of the AI-ADAM-100 are available now with commercial mass production targeted for later this year. Development support includes software tools, evaluation boards, and demo AI models, including Smart Home Appliance Wake-up and Control. To learn more about the AI-ADAM 100, visit <https://femtosen.se.ai/products/>

About Femtosense, Inc.

Femtosen.se enables real-time, on-device AI using sparse, localized mathematics. The company's products provide efficient, scalable, and affordable AI to mass market electronics that include hearables, appliances, wearables, security, TVs, smart homes, and industrial and automotive devices. Femtosen.se is based in Silicon Valley and has partners worldwide. For more information, visit www.femtosen.se.ai.

About ABOV Semiconductor Co., Ltd.

ABOV Semiconductor is a South Korea-based company that is a leading provider of microcontrollers for the consumer electronics, industrial automation, automotive, and IoT sectors. The company empowers cutting-edge technology that can elevate customer operations to new heights with its high-performance and cost-effective solutions. ABOV Semiconductor has set industry precedents with its robust R&D capabilities, close customer collaborations, and dynamic response to market changes. For more information about ABOV Semiconductor, please visit www.abov.co.kr.