

BrainChip Announces the Akida™ Architecture, a Neuromorphic System-on-Chip

Company introduces the architecture of the first in a new breed of neural network acceleration SoCs that puts artificial intelligence at the edge and the enterprise

SAN FRANCISCO, Sept. 10, 2018 (GLOBE NEWSWIRE) -- BrainChip Holdings Ltd. ("BrainChip" or the "Company") (ASX: BRN), the leading neuromorphic computing company, today establishes itself as the first company to bring a production spiking neural network architecture – the Akida Neuromorphic System-on-Chip (NSoC) – to market.

This architecture announcement firmly positions BrainChip as the leader in acceleration for artificial intelligence (AI) at the edge and the enterprise. The Akida NSoC is small, low cost and low power, making it ideal for edge applications such as advanced driver assistance systems (ADAS), autonomous vehicles, drones, vision-guided robotics, surveillance and machine vision systems. Its scalability allows users to network many Akida devices together to perform complex neural network training and inferencing for many markets including agricultural technology (AgTech), cybersecurity and financial technology (FinTech).

A New Entrant in a Large Market

"The artificial intelligence acceleration chipset marketplace is expected to surpass US\$60 billion by 2025," said Aditya Kaul, Research Director at Tractica, a leading market intelligence firm with a specialization in AI.

"Neuromorphic computing holds significant promise to accelerate AI, especially for low-power applications. As many of the technical hurdles are resolved, the industry will see the deployment of a new class of AI-optimized hardware over the next few years."

"Despite their best efforts, no other company, large or small, has managed to bring a neuromorphic computing chip to market in production volumes," said Lou DiNardo, BrainChip CEO. "Akida, which is Greek for 'spike,' represents the first in a new breed of hardware solutions for AI. Artificial intelligence at the edge is going to be as significant and prolific as the microcontroller. With the Akida NSoC, BrainChip is forging that path and leading the way. Our recent announcement of the Akida Development Environment is now followed by a detailed architectural description. We are collaborating with major global manufacturers in a multi-market strategy to drive early adoption of the Akida NSoC."

Akida NSoC: Biologically Inspired, Digitally Engineered

The Akida NSoC uses a pure CMOS logic process, ensuring high yields and low cost. Spiking neural networks (SNNs) are inherently lower power than traditional convolutional neural networks (CNNs), as they replace the math-intensive convolutions and back-propagation training methods with biologically inspired neuron functions and feed-forward training methodologies. BrainChip's research has determined the optimal neuron model and training methods, bringing unprecedented efficiency and accuracy. Each Akida NSoC has effectively 1.2 million neurons and 10 billion synapses, representing 100 times better efficiency than neuromorphic test chips from Intel and IBM. Comparisons to leading CNN accelerator devices show similar performance gains of an order of magnitude better images/second/watt running industry standard benchmarks such as CIFAR-10 with comparable accuracy.

"Spiking neural networks are considered the third generation of neural networks," said Peter van der Made, Founder and CTO of BrainChip. "The Akida NSoC is the culmination of decades of research to determine the optimum neuron model and innovative training methodologies."

Self-Contained for Embedded or Co-Processing Applications

The Akida NSoC is designed for use as a stand-alone embedded accelerator or as a co-processor. It includes sensor interfaces for traditional pixel-based imaging, dynamic vision sensors (DVS), Lidar, audio, and analog signals. It also has high-speed data interfaces such as PCI-Express, USB, and Ethernet. Embedded in the NSoC are data-to-spike converters designed to optimally convert popular data formats into spikes to train and be processed by the Akida Neuron Fabric.

Innovative Training Methodologies

Spiking neural networks are inherently feed-forward dataflows, for both training and inference. Ingrained within the

Akida neuron model are innovative training methodologies for supervised and unsupervised training. In the supervised mode, the initial layers of the network train themselves autonomously, while in the final fully-connected layers, labels can be applied, enabling these networks to function as classification networks. The Akida NSoC is designed to allow off-chip training in the Akida Development Environment, or on-chip training. An on-chip CPU is used to control the configuration of the Akida Neuron Fabric as well as off-chip communication of metadata.

The Akida Development Environment is available now for early access customers to begin the creation, training, and testing of spiking neural networks targeting the Akida NSoC. The Akida NSoC is expected to begin sampling in Q3 2019. For more information please see www.brainchip.ai.

About BrainChip Holdings Ltd. (ASX: BRN)

BrainChip Holdings Ltd. is a leading provider of neuromorphic computing solutions, a type of artificial intelligence that is inspired by the biology of the human neuron. The Company's revolutionary new spiking neural network technology can learn autonomously, evolve and associate information just like the human brain. The proprietary technology is fast, completely digital and consumes very low power. The Company provides software and hardware solutions that address the high-performance requirements in civil surveillance, gaming, financial technology, cybersecurity, ADAS, autonomous vehicles, and other advanced vision systems.
www.brainchip.com.

Company Contact

Robert Beachler
rbeachler@brainchipinc.com
+1 (949) 330-6750

Media Contact (US):

Kerry McClenahan
Publitek North America
kerry.mcclenahan@publitek.com
+1 (503) 546-1002

Investor Relations (US):

Ryan Benton
rbenton@brainchipinc.com
+1 (408) 218-3816

Investor Relations (Australia):

ir@brainchipinc.com

Media Contact (Europe):

Nayl D'Souza
Publitek
nayl.dsouza@publitek.com
+44 20 3813 6423

Media Contact(Australia):

Alexander Liddington-Cox
Media and Capital Partners
alex.liddingtoncox@mcpartners.com.au
+61 474 701 469



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