Automata processing naturally inspired by neural networks

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Automata Processor DIMM

One topic trending recently in the high-tech semiconductor industry has been the discussion around compute systems that mimic the functionality of the brain. Sometimes referred to as neuromorphic computing, the concept draws inspiration from a range of diverse areas including biology, physics, mathematics, computer science, and electronic engineering.

This has prompted the question: Is Micron's Automata Processor (AP) one of these "brain chips"? And the answer? Well, yes and no.

To be clear: Micron did not start out with the intention of building a "brain chip." As we explored new semiconductor architectures that could handle complex data analysis, we were led naturally to a design that embodies some (but certainly not all) of the very same concepts

associated with biological brains.

First, the Automata Processor and the human brain are both massive collections of small, simplistic detection elements that receive input stimuli and are programmed to respond in a specific way. These elements can be considered analogous to biological neurons; however, they are digital in nature—while biological neurons are better described as analog.

Secondly, the massive routing capability implemented in the AP can be considered analogous to the dendritic connections that exist in biological brains. For instance, each processing element contained in the AP generates a binary output, something we call an activation signal. These activation signals are routed to any number of nearby cells. Collectively, all processing elements are connected to each other, enabling the AP to perform spatial temporal pattern matching—the very essence of processing that takes place in the human neocortex.

So, although we didn't set out to create a brain chip, in some ways we ended up with one—or something relatively close. But the really exciting news is that with the recent availability of tools and resources that support the AP, developers can begin interacting with the AP to discover more about its amazing capabilities. And once they do, I will be very interested in hearing what they have to say about the AP's brain-like qualities.

More information: www.micronautomata.com/

Source: Micron