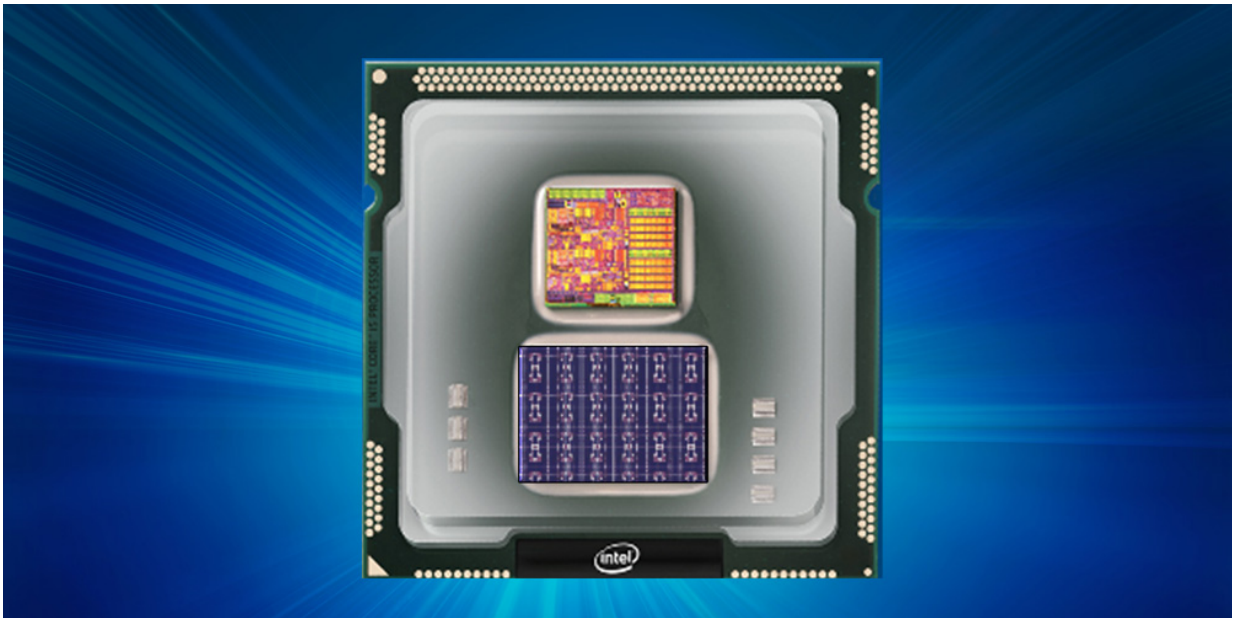# Loihi: Introducing self-learning chip from Intel, to rev up AI

September 27 2017, by Nancy Owano

Credit: Intel

(Tech Xplore)—A self learning chip from Intel designed to work like the human brain has been announced.

The chip is codenamed Loihi. Dr. Michael Mayberry did the introductions in his editorial on Monday. He is corporate vice president and managing director of Intel Labs.

His announcement is valuable on two levels—it presents information about the chip per se but he also shares insights into what Intel scientists are up to when they talk in terms of a chip that can mimic basic mechanics of the human brain. That is interesting language, but what does it actually mean? What does it do for us?

Mayberry drew some examples of the chip's impact.

These would include complex decisions made faster and adapting over time; industrial problems solved using learned experiences; first responders to missing or abducted person reports using image-recognition applications and analyzing streetlight camera images. Traffic gridlock would change, as stoplights could automatically adjust timing to sync with the flow of traffic.

He said that "Our work in neuromorphic computing builds on decades of research and collaboration...combination of chip expertise, physics and biology yielded an environment for new ideas."

Neuromorphic computing draws from what we understand about the brain's architecture and its computations. In turn, Loihi mimics how the brain functions; it uses data to learn and make inferences; it gets smarter over time and it does not need to be trained in the traditional way.

"Machine learning models such as deep learning have made tremendous recent advancements by using extensive training datasets to recognize objects and events. However, unless their training sets have specifically accounted for a particular element, situation or circumstance, these machine learning systems do not generalize well."

He said, "Compared to technologies such as convolutional neural networks and deep learning neural networks, the Loihi test chip uses many fewer resources on the same task."

Mayberry wrote about asynchronous spiking. "The brain's neural networks relay information with pulses or spikes, modulate the synaptic strengths or weight of the interconnections based on timing of these spikes, and store these changes locally at the interconnections."

The chip was reported as extremely energy-efficient. Mayberry said, "it is up to 1,000 times more energy-efficient than general purpose computing required for typical training systems."

What's next? The Loihi test chip is to be shared with leading university and research institutions in the first half of 2018. The focus will be on advancing AI.

Tom Simonite in *Wired* had more details on the chip's progress. "Mayberry says the first full [version](#) of the [chip](#), with 130,000 neurons and the size of a pinkie fingernail, will be fabricated in November," with academic and research institutions getting to try it in 2018.

  More information: [newsroom.intel.com/editorials/ … ficial-intelligence/](#)

© 2017 Tech Xplore