IBM Unveils 4096-Core "Neurosynaptic" Chip

Written by Marco Attard
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As part of research into creating brain-like computers IBM unveils what it claims is the first "neurosynaptic" computer chip, one packing 4096 cores simulating the operation of 1 million neurons and 256 million synapses.

Dubbed "TrueNorth", the chip carries 5.4 billion transistors, making it one of the largest CMOS chips ever built, yet consumes only 70mW when running in realtime. Altogether, IBM says the chip performs 46 billion synaptic operations per second, per watt.

While the numbers sound vast, one has to keep in mind the dazzling complexity of nature-- 1 million neurons and 256 million synapses mean a single TrueNorth chip has all the brain power of a cockroach. That aside, it still represents a breakthrough for IBM as the second generation chip built on "neuroscience-inspired scalable and efficient computer architecture."

The architecture is scalable, and IBM also has a 16-chip system simulating 16m neurons (the amount making a frog's nervous system, fact fans) and 4bn synapses.

The neurosynaptic chip research is part of the SyNAPSE (Systems of Neuromorphic Adaptive Plastic Scalable Electronics) project, a DARPA effort in the creation of brain-like hardware unlike the von Neumann machines we know today. Such machines, IBM predicts, can be more efficient at making computers see, hear and smell the world just like we do.

"We foresee new generations of IT systems-- that complement today's von Neumann machines-- powered by an evolving ecosystem of systems, software, and services," Big Blue

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says. "These brain-inspired chips could transform mobility, via sensory and intelligent applications that can fit in the palm of your hand but without the need for wifi."

The next step for IBM is to release the SyNAPSE ecosystem, including a custom programming language, to universities and business customers, as well as the military. Until then, research will go on.

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