

Weebit Nano & Polimi present paper on novel AI self-learning ReRAM hardware at leading industry conference

21 July 2020 – Weebit Nano (ASX: WBT), the next generation memory technology for the global semiconductor industry, and the Politecnico di Milano in Italy (Polimi), a leading European university for Industrial and Information Engineering, Technology and Industrial Design, have presented a joint research paper on a novel Artificial Intelligence (AI) self-learning demonstration based on Weebit's silicon oxide (SiOx) ReRAM at a prominent industry conference.

Held virtually in June, the VLSI Technology and Circuits Symposia is the premier conference for the international semiconductor and circuits industry.

Presented by Polimi at the Symposia on VLSI Technology and Circuits, the paper outlines a brain-inspired AI system which can perform unsupervised learning tasks with high accuracy results.

It uses Polimi's developed hardware design and Weebit's silicon oxide ReRAM to combine the efficiency of the state of the art Convolutional Neural Networks (CNN) with the plasticity of brain-inspired Spiking Neural Networks, enabling the hardware to learn new things without forgetting trained tasks of previously acquired information. In this way, it enables unsupervised learning typical of the human brain which learns new skills throughout its whole life adapting to its environment, without forgetting older information.

The system's accuracy has been validated by standard databases, including digit recognition (MNIST) at 99.3 percent, dataset of clothing (Fashion-MNIST) at 93 percent and CIFAR-10 (various object recognition dataset) at 91 percent.

In addition, the demonstration adapts its operative frequency for power saving, enabling continual learning of up to 50 per cent for non-trained classes. The use of power saving spike-frequency modulation enables feasible solutions for lifelong learning in autonomous AI systems.

Professor Ielmini, recipient of the Intel 2013 Outstanding Researcher Award, who has held visiting positions at Intel and Stanford University and conducted research on emerging non-volatile memories for several years, said: "Continual learning is essential for us as humans to accumulate knowledge. Artificial neural networks currently lack this ability, as the previous knowledge is generally erased by a second training – a process known as catastrophic forgetting. This AI system combines the best of both worlds, namely the accuracy of deep learning and the flexibility of the human brain, thus moving one step closer to the realisation of brain-like hardware."

Coby Hanoch, CEO of Weebit Nano, said: "Weebit's progress with Professor Ielmini on a joint neuromorphic ReRAM project over the past year, demonstrates the capability of our silicon oxide ReRAM technology in artificial intelligence applications. Our ongoing collaboration with Polimi will ensure our technology is at the forefront of future artificial intelligence and neuromorphic computing applications, addressing the challenges of tomorrow."



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This announcement has been authorised for release by the Board.

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About Weebit Nano Limited

Weebit Nano is a leader in the development of next generation computer memory technology, and plans to become the new industry standard in this space. Its goal is to address the growing need for a significantly higher performance and lower power computer memory technology. Weebit Nano's ReRAM technology is based on fab-friendly Silicon Oxide, allowing the company to rapidly execute, without the need for special equipment or preparations. The company secured several patents to ensure optimal commercial and legal protection for its ground-breaking technology.

Weebit Nano's technology enables a quantum leap, allowing semiconductor memory elements to be significantly cheaper, faster, more reliable and more energy efficient than the existing Flash technology. Weebit Nano has signed an R&D agreement with Leti, an R&D institute that specialises in nanotechnologies, to further develop SiOx ReRAM technology.

For more information please visit: <http://www.weebit-nano.com/>



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