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Process And Store Memory In A Single Chip

In the future, data could be processed where it is stored, paving the way for thinner, smaller computers and mobile devices.

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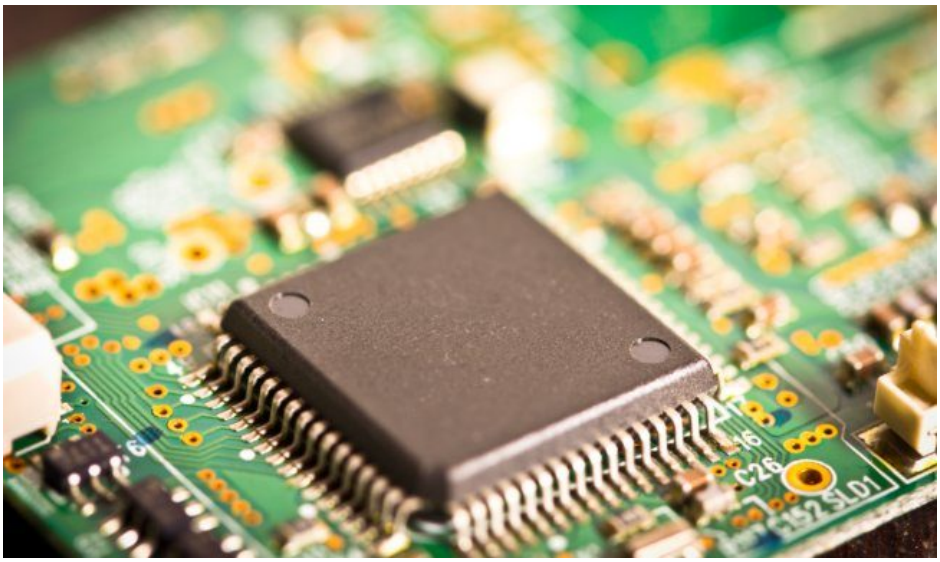

AsianScientist (Jan. 9, 2017) - An international scientists team of scientists has found a way to make memory chips perform computing tasks that are traditionally done by computer processors like those made by Intel and Qualcomm. Their findings, published in *Scientific Reports*, mean that data can now be processed in the same spot where it is stored, leading to much faster and thinner mobile devices and computers.

Redox-based resistive switching random access memory (ReRAM) chips use different electrical resistance to store information, making it possible to store the data in a higher number of states than the existing binary system.

However, instead of storing information, NTU Assistant Professor Anupam Chattopadhyay in collaboration with Professor Rainer Waser from RWTH Aachen University and Dr Vikas Rana from Forschungszentrum Juelich showed how ReRAM can also be used to process data.

The prototype ReRAM circuit processes data in four states instead of two. Using ReRAM for computing in this manner will be more cost-effective than other computing technologies on the horizon, since ReRAMs will be available in the market soon, Chattopadhyay said.

> "ReRAM is a versatile non-volatile memory concept. These devices are energy-efficient, fast, and they can be scaled to very small dimensions. Using them not only for data storage but also for computation could open a completely new route towards an effective use of energy in the information technology," Waser added.

The research team is now looking to engage industry partners to leverage this important advance of ReRAM-based ternary computing. The researchers will also work on developing the ReRAM to process more than its current four states, which will lead to great improvements of computing speeds as well as to test its performance in actual computing scenarios.

The article can be found at: Kim et al. (2016) Multistate Memristive Tantalum Oxide Devices for Ternary Arithmetic.

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