**عنوان مقاله:**

Implementation of a programmable neuron in CNTFET technology for low-power neural networks

**محل انتشار:**

تعداد صفحات اصل مقاله: 10

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**خلاصه مقاله:**

Circuit-level implementation of a novel neuron has been discussed in this article. A low-power Activation Function (AF) circuit is introduced in this paper, which is then combined with a highly linear synapse circuit to form the neuron architecture. Designed in Carbon Nanotube Field-Effect Transistor (CNTFET) technology, the proposed structure consumes low power, which makes it suitable for the implementation of high-throughput Neural Networks (NNs). The main advantage of the proposed AF circuit is its higher accuracy for the generation of hyperbolic tangent function compared to the previously reported works. Moreover, the programmability feature for the slope and the position shifting enhances the adaptability of the designed neuron for different types of neural systems, especially Multi-Layer Perceptrons (MLPs). There is also excellent compatibility between the synapse and activation circuits, which illustrates another notable privilege of the proposed neuron. Simulations using HSPICE for CNTFET ۳۲ nm standard process have been carried out for the designed scheme to indicate the correct operation. Based on the results, all of the claimed advantages can be proved clearly while the power dissipation is ۶.۱۱µW from the ۰.۹V power supply. Also, an accuracy of ۹۸% has been achieved for the AF circuit.

**کلمات کلیدی:**

Activation Function, Artificial Neural Networks, CNTFET, logistic function, Neuron, Synapse

**لینک ثابت مقاله در پایگاه سیویلیکا:**

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