How Neural Plasticity Boosts Performance of Spiking Neural Networks

Submission ID 3000227

Submission Type Poster

Topic Artificial Intelligence

Status Submitted

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SUBMISSION DETAILS

Presentation Type Oral Presentation

Presentation Abstract Summary Spike timing-dependent plasticity (STDP) is important to understanding plasticity in the brain and is capable of performing functionally significant tasks such as unsupervised learning of visual features, forming sparse representations of temporal sequences, and computing with neural synchrony. However, STDP exhibits runaway synaptic potentiation. Employing homeostatic synaptic scaling, intrinsic plasticity, along with structural plasticity mechanisms, can stabilize the network performance. Guided by these plasticity mechanisms, we develop adaptive spiking neural network accelerators that perform unsupervised learning. The proposed integrative approach is demonstrated on memrisitve neuromorphic accelerators with on-device learning, useful for sensors and IoT.

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Keywords

Keywords
Spiking Neural Networks;
STDP
Synaptic Normalization
Intrinsic Plasticity;
Neurogenesis
Memristor