

Spiking neural networks enabling massively parallel, low-power & low-latency computation

Alexandre Valentian, Ph.D.

Head of Advanced Technologies and Systems-on-chip Laboratory

LETI

TYPES OF ITEMS TO BE DEMONSTRATED:

CEA-Leti will introduce 'SPIRIT', the world-first fully integrated neural network on-chip with non-volatile resistive memory. So far, memories were placed outside of chips leading to high energy consumption. With this co-integration in the same die of analog spiking neurons and resistive synapses leveraging resistive random access memory cells (RRAM), CEA-Leti enables the push for distributed computing devices to support artificial intelligence at the edge. These spiking neural networks are designed by CEA-Leti and the RRAM are fabricated in a post-process at CEA-Leti on CMOS-based wafers.

RELEVANCE TO TINYML:

SPIRIT allows massively parallel, low-power and low latency computation. It is a perfect candidate for embedded classification applications required in Lidars or IoT devices. The technology also finds applications in event-based sensors packed with rich temporal content