

## **Better Learning Through Specialization**

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At the edge, where sensor data is collected and physical interactions are mediated, we often lack the infrastructure necessary to support large scale computationally intensive machine learning. For these power-starved remote scenarios, DARPA/MTO is strategically investing in future technologies that enable ultra-high efficiency computing and real-time decision making regardless of whether a sensor is connected back to the cloud or is in a more autonomous deployment. Our projects include nanowatt-class “wake-up” circuits for near-passive, high discrimination environmental unattended sensing and spectrum sharing algorithms that exploit machine learning to most efficiently divide available RF bandwidth among competing users without the need for prescribed standards. To complement these technologies, MTO is concurrently developing the next wave of specialized machine learning processors that overcome the “memory wall” limitation inherent in existing architectures, resulting in upwards of a 70X improvement in the energy\*execution time metric. Together with its commercial, academic and defense industry partners, DARPA is charting a path towards effective yet efficient machine learning hardware at the edge.