Computing on the Extreme Edge

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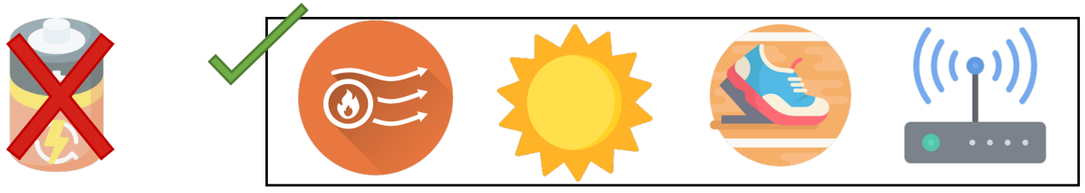
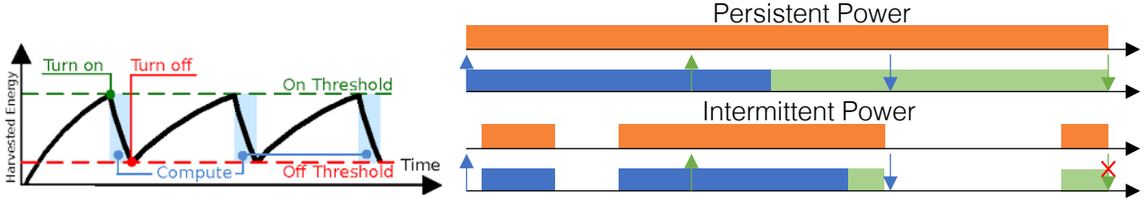
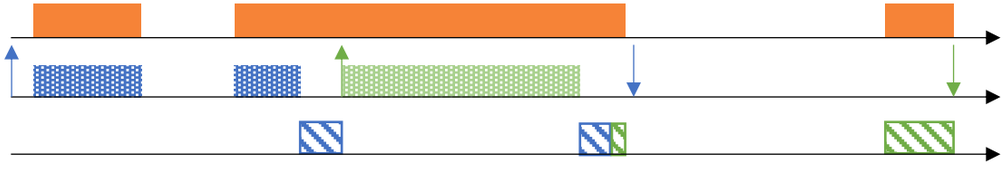
To support 1 trillion IoT devices by 2035, we need to move from batteries towards sustainable sources.



Time-Aware On-Device computing in batteryless devices is challenging due to intermittently available energy.

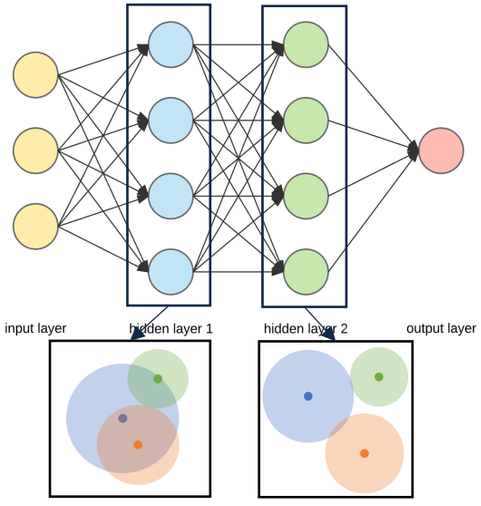


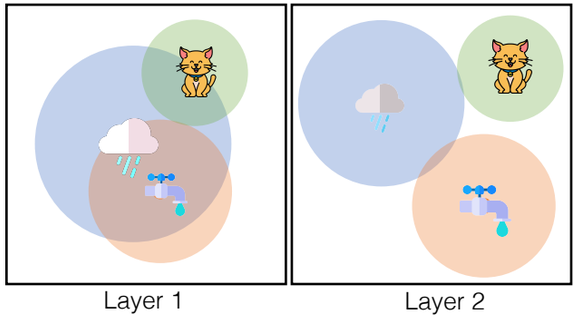
A solution for executing computationally expensive tasks, e.g., Deep Neural Network (DNN) inference, in time-aware intermittent systems is using imprecise computing.



We propose Zygarde — which is an energy- and accuracy-aware soft real-time task scheduling framework for batteryless systems that **flexibly execute deep learning tasks** that are suitable for running on microcontrollers.

Zygarde utilizes **layer-dependent expressiveness of deep features** and **semantic diversity** of input data





Zygarde decreases the execution time of DNN inference by up to 26% and schedules 9% – 34% more tasks with up to 21% higher inference accuracy, compared to traditional schedulers such as the earliest deadline first (EDF).