End-to-End Sound Classification On Loihi Neuromorphic Chip

Mohammad Ebrahimpour, Graduate Researcher, UC Merced

Machine learning approaches to sound classification are traditionally based on engineered features such as those derived from the spectrum or cepstrum. More recently, end-to-end classification systems in image and auditory recognition systems have been developed to learn features jointly with classification, resulting in increased classification accuracy. A secondary benefit of this approach is the potential to simplify classification models for deployment on low power hardware. In our research, we are training deep neural networks to perform end-to-end environmental sound classification using Keras on a GPU and then applying an algorithmic translation to create a spiking neural network deployed on an Intel Loihi neuromorphic processor. SNNs on neuromorphic hardware can offer significantly better power efficiency than DNNs on conventional hardware and that translates to smaller intelligent devices. We will discuss the accuracy and efficiency of the resulting models and demonstrate end-to-end sound classification on this emerging class of tiny machine learning hardware.