

Machine learning for neutrino identification

Monday, October 21, 2019 12:00 PM (30 minutes)

This talk will cover the current state of machine learning (ML) in neutrino experiments. In experiments like the Deep Underground Neutrino Experiment (DUNE), NuMI Off-axis νe Appearance (NO ν A), the Micro Booster Neutrino Experiment (MicroBooNE), and Argon Neutrino Teststand (ArgoNeuT), deep learning (DL) approaches based around convolutional neural networks have been developed to provide highly accurate and efficient selections of neutrino interactions. Moreover, there is also other exciting ongoing work in DUNE focused on applying ML to tasks such as developing Generative Adversarial Networks (GANs) for photon simulation; or using Graph Neural Networks for track vs. shower hit-classification. In addition to the above, DUNE is also collaborating with high-tech companies to run some of their ML models on Tensor Processing Unit (TPU), and Field-programmable gate array (FPGA), specific hardware provided by Google and Micron Technology, respectively. Finally, the Tokai to Kamioka (T2K) experiment is also using a novel DL approach for the 3D reconstruction of the SuperFGD detector events.

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