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Deep Learning for Event Reconstruction at DUNE

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DUNE is the next-generation neutrino experiment will play a decisive role to measure neutrino CP violation and mass hierarchy. DUNE far detectors will use liquid argon time projection chamber (LArTPC) technology which provides an excellent spatial resolution, high neutrino detection efficiency, and superb background rejection. To successfully accomplish the role of DUNE, the reconstruction of neutrino event is crucial. However, precise reconstruction can be limited by missing energy, detector response, invisible energy, and hadron identities. To address these issues, we developed deep learning methods, Convolutional Neural Networks (CNNs), to reconstruct neutrino events directly from pixel images of interactions in the detector. In this talk, we will focus on developments of CNNs to reconstruct the neutrino energies and interaction vertices.

Primary authors: SEONG, Ilsoo (University of California Irvine (US)); BIAN, Jianming (University of California Irvine (US))

Presenter: BIAN, Jianming (University of California Irvine (US))

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