

Expanding DUNE's Machine Learning Framework with Multi-Detector Input for the 2x2 Demonstrator

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DUNE's Near Detector utilizes new technological advancements for Liquid Argon (LAr) Time Project Chambers (TPC), including a modular design and pixel plane charge readout as opposed to the usual wire plane readouts. The full detector will be composed by 5x7 modules, but a demonstrator prototype with 2x2 modules is currently assembled and will take DUNE's first neutrino beam data at Fermilab. A machine learning framework using convolutional and graph neural networks has been developed to reconstruct and identify particle footprints across the LAr modules. The demonstrator's 2x2 LAr modules expect minimal containment of the particle tracks at its placement near the Neutrinos at the Main Injector (NuMI) beam source. Thus, some planes from the solid scintillator detector MINERvA have been repurposed to capture muon tracks upstream and downstream of the LAr 2x2 modules. This poster outlines DUNE's current machine learning framework to reconstruct LAr TPC events and the potential to integrate data from a different detector medium to improve classification of particle clusters.

Poster prize

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