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Machine Learning-Assisted Unfolding for Neutrino Cross-section Measurements

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The choice of unfolding method for a cross-section measurement is tightly coupled to the model dependence of the efficiency correction and the overall impact of cross-section modeling uncertainties in the analysis. A key issue is the dimensionality used, as the kinematics of all outgoing particles in an event typically affects the reconstruction performance in a neutrino detector. OmniFold is an unfolding method that iteratively reweights a simulated dataset using machine learning to utilize arbitrarily high-dimensional information that has previously been applied to collider and cosmology datasets. Here, we demonstrate its use for neutrino physics using a public T2K near detector simulated dataset, and show its performance is comparable to or better than traditional approaches using a series of mock data sets.

Working Group

WG 2: Neutrino Scattering Physics

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