Neutrino Physics and Machine Learning (NPML)



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## Graph Neural Networks for Reconstruction in Liquid Argon Time Projection Chambers

Tuesday, 14 July 2020 10:00 (25 minutes)

Graph neural networks (GNNs) are a category of neural networks which operate on graph-structured inputs, instead of the grid-structured inputs required by a CNN. Building on work developed for the HL-LHC for particle tracking with GNNs as part of the Exa.TrkX collaboration, this talk presents work to develop GNN-based techniques for hit-level reconstruction in Liquid Argon Time Projection Chambers (LArTPCs). A summary is provided of workflows to perform clustering and spacepoint deghosting in two and three dimensions, using simulations of both atmospheric and beam neutrino interactions, primarily utilising an attention messagepassing GNN architecture. Preliminary results will be presented for the application of edge classification to group hits into clusters, and future plans for exploring a broader variety of GNN architectures will be discussed.

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