

Graph Neural Network for Object Reconstruction in Liquid Argon Time Projection Chambers

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This paper presents a graph neural network (GNN) technique for low-level reconstruction of neutrino interactions in a Liquid Argon Time Projection Chamber (LArTPC). GNNs are still a relatively novel technique, and have shown great promise for similar reconstruction tasks in the LHC. In this paper, a multihead attention message passing network is used to classify the relationship between detector hits by labelling graph edges, determining whether hits were produced by the same underlying particle, and if so, the particle type. The trained model is 84% accurate overall, and performs best on the EM shower and muon track classes. The model's strengths and weaknesses are discussed, and plans for developing this technique further are summarised.

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