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Reconstructing Michel Electrons in ICARUS with Deep Neural Networks

Deep neural networks (DNN) enabled countless breakthroughs in the fields of artificial intelligence and computer vision and they have been successfully applied to the data reconstruction of Liquid Argon Time Projection Chambers (LArTPC), which offer high resolution (~3mm/pixel) 2D or 3D imaging of charged particles' trajectories. The ICARUS detector is a large-scale (760-ton) LArTPC far detector for the Short Baseline Neutrino program, currently being commissioned at Fermilab. In this poster, we present DNNs for pixel-level particle type classification and prediction of particle start and end points, specifically designed for sparse LArTPC data, as a part of a full DNN-based data reconstruction chain developed by the SLAC group. We study their application in ICARUS to the reconstruction of a Michel electron, a commissioning analysis target for the calibration of the low energy electromagnetic showers.

Mini-abstract

Deep Neural Networks are a promising technique for Michel electron reconstruction in ICARUS

Experiment/Collaboration

ICARUS

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