

A Deep Learning Approach to the MicroBooNE Low Energy Analysis

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MicroBooNE is a liquid argon Time Projection Chamber (TPC) located in the Booster Neutrino Beam at Fermilab. One of its main goals is to study the $>3\sigma$ excess observed at low energy ($E_\nu \sim 200\text{-}600$ MeV) by the MiniBooNE experiment, which was located in the same beam.

Two independent analyses are ongoing in MicroBooNE to study this possible excess.

One of them uses Deep Learning Convolutional Neural Network (CNN) tools, originally developed for image analysis, to reconstruct and identify particle tracks in the (1-proton, 1-lepton)CCQE neutrino final state topology.

I will first present the detector and discuss the low energy excess seen by MiniBooNE, then detail the CNN-based event reconstruction with emphasis on Neural Network techniques and our benchmarking strategy.

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