

Applying Deep Neural Network Techniques for LArTPC Data Reconstruction

Deep Learning is making revolutionary advancements in the field of artificial intelligence and computer vision (CV). As we have recently shown, Convolutional Neural Networks (CNNs), one type of Deep Learning algorithm, can also be successfully used for data reconstruction and analysis of liquid argon time projection chambers (LArTPCs). These algorithms aim to fully exploit the detailed imaging and calorimetric information provided by LArTPCs breathtaking resolution ($\sim 3\text{mm/pixel}$) in either 2D projected images or natively 3D data representation with calorimetric information. MicroBooNE experiment is pioneering the use of CNNs beyond simple CV image classification into a full chain of data reconstruction algorithms including interaction vertex localization, electromagnetic shower particle identification at the pixel-level, and clustering of energy depositions. In this poster we present recent development of CNN applications for 2D and 3D LArTPC data reconstruction.

Authorship annotation

for the MicroBooNE collaboration

Session and Location

Monday Session, Poster Wall #120 (Auditorium Gallery Left)

Poster included in proceedings:

yes

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Track Classification: Poster (participating in poster prize competition)