



Contribution ID: 600 Contribution code: **contribution ID 600**

Type: **Poster**

Sparse Convolutional Neural Networks for particle classification in ProtoDUNE events

Deep Learning (DL) methods and Computer Vision are becoming important tools for event reconstruction in particle physics detectors. In this work, we report on the use of Submanifold Sparse Convolutional Neural Networks (SparseNet) for the classification of track and shower hits from a DUNE prototype liquid-argon detector at CERN (ProtoDUNE). By taking advantage of the three-dimensional nature of the problem we use a set of nine input features to classify sparse and locally dense hits associated to track or shower particles. The SparseNet has been trained on a test sample and shows promising results: efficiencies and purities greater than 90%. This has also been achieved with a considerable speedup and substantially less resource utilization with respect to other DL networks such as graph neural networks. This method offers great scalability advantages for future large neutrino detectors such as the planned DUNE experiment.

Significance

References

Speaker time zone

Compatible with Europe

Primary authors: ABED ABUD, Adam (University of Liverpool (GB) and CERN); HENNESSY, Karol (University of Liverpool (GB)); WHITEHEAD, Leigh Howard (University of Cambridge (GB)); ALONSO MONSALVE, Saul (ETH Zurich)

Presenter: ABED ABUD, Adam (University of Liverpool (GB) and CERN)

Session Classification: Posters: Broccoli

Track Classification: Track 2: Data Analysis - Algorithms and Tools