Contribution ID: **58** Type: **not specified**

Predicting Missing Regions of Charged Particle Tracks Using a Sparse 3D Convolutional Neural Network

This study explores the use of a Sparse 3D Convolutional Neural Network (ConvNet) to infer missing regions of charged particle tracks. Hits corresponding to energy depositions are voxelized into a three-dimensional (3D) grid for each track. Inactive regions within the tracks are replaced with a dense, rectangular 3D grid of voxels, ensuring consistent step sizes in X, Y, and Z directions. Voxels in these dense regions are initialized with an energy value of -1, indicating nonphysical energy or charge. The model is trained to predict which voxels should activate as part of the track and which should not. Results indicate that the model accurately predicts track voxels within ±1 unit in X, Y, or Z directions and effectively identifies non-track voxels, despite some overprediction. The approach shows promise in prediction of missing track regions with some accuracy.

Primary author: UTAEGBULAM, Hilary (University of Rochester)

Presenter: UTAEGBULAM, Hilary (University of Rochester)

Session Classification: Poster Session