

Workshop on Machine Learning for Analysis of High-Energy Cosmic Particles



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Contribution ID: 27

Type: **Talk**

IceTop-CNN: Cosmic-Ray Reconstruction in IceTop using a Convolutional Neural Network with Low-Level Inputs (Remote)

Thursday, 30 January 2025 14:40 (20 minutes)

We present on the development of an application for training and evaluating convolutional neural networks for use with high-statistics, minimally-cut cosmic-ray anisotropy studies. This application has been built to utilize computing resources from the IceCube Observatory using the HTCondor workload management system. Our goal is to streamline the creation of lightweight models that can successfully reconstruct well-captured and uncontained events over a large zenith range using only low-level charge and time information as inputs. By doing this, we aim to minimize systematic uncertainty in our models while maintaining the accuracy of models trained on higher-level parameters. Our current baseline model is capable of estimating the energies of 68% of unfiltered simulations in our dataset within 15% of their true values. The application is intended to be accessible to novices in machine learning and data science with guides for installation and creating and assessing models available. We hope to see improvement in both the reconstructions of additional event characteristics and accessibility of our application to beginners in programming and research.

Type of Contribution

talk

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Session Classification: Talks