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Reconstructing Neutrino Energy using CNNs for GeV Scale IceCube Events

Thursday 15 July 2021 19:00 (12 minutes)

Measurements of neutrinos at and below 10 GeV provides unique constraints of neutrino oscillation parameters as well as probes of potential Non-Standard Interactions (NSI). The IceCube Neutrino Observatory's DeepCore array is designed to detect neutrinos down to GeV scales. This work uses convolutional neural networks (CNNs) to improve the energy reconstruction resolution and speed of reconstructing 10-GeV scale neutrino events in IceCube. Compared to past likelihood-based methods which take seconds to minutes, the CNN is expected to provide approximately a factor of 2 improvement in energy resolution and reconstructs in milliseconds which is a great advantage for large datasets.

Keywords

neural network, convolutional neutral network, CNN, machine learning, reconstruction

Collaboration

IceCube

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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Session Classification: Discussion

Track Classification: Scientific Field: NU | Neutrinos & Muons