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Deep Learning-Based Stereoscopic Event Reconstruction for CTAO using CTLearn

The Cherenkov Telescope Array Observatory (CTAO), a next-generation ground-based gamma-ray observatory, will be composed of two arrays of multiple imaging atmospheric Cherenkov telescopes (IACTs) located in both the Northern and Southern Hemispheres. Its goal is to enhance the sensitivity of current instruments by a factor of five to ten over an energy range from 20 GeV to over 300 TeV. IACT arrays are used to probe the very-high-energy (VHE) gamma-ray sky, operating by simultaneously observing air showers triggered by the interaction of VHE gamma rays and cosmic rays with the atmosphere. Cherenkov photons produced by these showers create a stereoscopic record of the event. By reconstructing the event using machine learning techniques, the properties of the originating VHE particle—including its type, energy, and incoming direction—can be determined. In this contribution, we present a fully deep-learning-driven approach to reconstruct simulated, stereoscopic IACT events using CTLearn. CTLearn is a package designed for loading and manipulating IACT data and for running deep learning models with pixel-wise camera data as input.

Collaboration(s)

CTAO LST Project

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