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Evaluating the scientific potential and performance of Gammalearn on LST-1 observations

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The upcoming Cherenkov Telescope Array Observatory (CTAO) represents the next generation of Imaging Atmospheric Cherenkov Telescopes (IACTs), offering a significantly enhanced sensitivity, up to five to ten times greater than existing instruments. Its first prototype, the Large-Sized Telescope (LST-1), is currently operational at the Roque de los Muchachos Observatory in La Palma, Spain. Deep learning techniques have shown promising results in reconstructing key physical properties of incident particles, such as energy, arrival direction, and particle classification, when applied to simulated data. While traditional techniques rely on simple parameterization of the shower image shape, deep learning can leverage the full temporal and charge information of the images, extracting additional information that is particularly valuable at the lowest energies (˜20 GeV) accessible by LST-1. These insights are crucial for studying distant extragalactic sources, such as Active Galactic Nuclei, which can serve as probes for fundamental physics and cosmology. In this context, GammaLearn, a deep learning framework for IACTs data analysis, has demonstrated strong potential in this energy range (Vuillaume et al., 2021, ICRC).
Here, we apply GammaLearn to observational data from LST-1 to assess its performance on real data.

Collaboration(s)

CTAO LST Project

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