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Deep Learning applied to the Cherenkov Telescope Array data analysis

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The Cherenkov Telescope Array (CTA) is the next generation of ground-based gamma-ray telescopes for gamma-ray astronomy. Two arrays will be deployed composed of 19 telescopes in the Northern hemisphere and 99 telescopes in the Southern hemisphere. Observatory operations are planned to start in 2021 but first data from prototypes should be available already in 2019. Due to its very high sensitivity, CTA will record a tremendous amount of data that represent a computing challenge to the reconstruction software. Moreover, the vast majority of triggered events come from protons whereas only photons are of interest for the study of astrophysical sources.
Deep learning developments in the last few years have shown tremendous improvements in the analysis of data in many domains. Thanks to the huge amount of simulated data and later of real data, produced by CTA, these algorithms look particularly adapted and very promising. Moreover, the trained neural networks show very good computing performances during execution.
Here we present a first study of deep learning architectures applied to CTA simulated data to perform the energy reconstruction of the particles as well as their discrimination.

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