

Machine learning enhancements for Cherenkov telescope data analysis

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We developed deep learning enhancements for the real-time analysis of Cherenkov telescopes data, applicable to the context of the Cherenkov Telescope Array Observatory (CTAO). The CTAO will have a Science Alert Generation (SAG) system tasked with real-time reconstruction and analysis of data, as part of the Array Control and Data Acquisition (ACADA) system. We developed two applications of Convolutional Neural Network (CNN) based models, trained offline on 20k simulations and applicable for online inference. The first model is an auto-encoder trained to learn and subtract the background level of a given observation. The second model computes a 2-dimensional regression to identify candidate sources in the field of view. We compared results with standard techniques and found that our models achieve comparable accuracy without relying on a priori assumptions such as candidate coordinates, background model or instrument response function.

Primary author: DI PIANO, Ambra (Istituto Nazionale di Astrofisica (INAF))

Co-authors: BULGARELLI, Andrea (Istituto Nazionale di Astrofisica (INAF)); GREGORI, Daniele (E4 computer engineering SpA); BENEVENTANO, Domenico (Università di Modena e Reggio Emilia; INAF/OAS Bologna); BOELLA, Elisabetta (E4 computer engineering SpA); PANEBIANCO, Gabriele (Istituto Nazionale di Astrofisica (INAF)); CASTALDINI, Luca (INAF/OAS Bologna); PALADINO, Mattia (E4 computer engineering SpA); Dr PARMIGGIANI, Nicolo' (Istituto Nazionale di Astrofisica (INAF)); FALCO, Riccardo (INAF/OAS Bologna); Dr FIORETTI, Valentina (Istituto Nazionale di Astrofisica (INAF))

Presenter: DI PIANO, Ambra (Istituto Nazionale di Astrofisica (INAF))

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