Contribution ID: **153** Type: **oral**

Search for optimal deep neural network architecture for gamma ray search at KASCADE

Tuesday, 26 July 2022 17:30 (15 minutes)

We present first steps of the search for ultra-high-energy (> PeV) gamma rays based on archival data acquired by the KASCADE experiment.

This one operated from 1996 to 2013 and the collected statistics is comparable with those of modern ovservatories. The data is provided by the KASCADE Cosmic ray Data Center (KCDC) and public accessible.

Since the signatures left by gamma rays and protons background are similar, the main aim of the research is to distinguish them with machine learning methods.

For that, we present a primary particle type classifiers (gamma or not) trained on the basis of the simulation data of the KASCADE detector. We use and compare results of various deep learning methods as a graph neural network, self-attention network, compact convolutional transformer.

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Session Classification: Parallel 1

Track Classification: CRI