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Search for optimal deep neural network architecture for gamma detection at KASCADE

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We focus on the novel data analysis from KASCADE, one of the most successful cosmic ray detectors in the >PeV range. The detector operated for about 15 years, its data are publicly accessible. The data archive includes about half a billion recorded air showers. Extensive air showers generated by ultrahigh-energy gamma-rays (not detected at the moment) are of particular research interest, since information about particles of this type allows us to learn about the properties of cosmic ray sources, as well as to study the nature of diffuse photons. The main problem is that this type of particle is difficult to distinguish against the background of cosmic protons, since the signatures left by protons and photons have similar characteristics. To solve this problem, we present a primary particle type classifier (gamma or proton) trained on the basis of the simulation data of the KASCADE detector. For classification, various approaches are applied using deep learning methods.

Type of Contribution

talk

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