UNIVERSITY OF DELAWARE
BARTOL RESEARCH
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Contribution ID: **20**   Type: **Talk**

Towards mass composition study with KASCADE using deep learning

Thursday, 3 February 2022 09:35 (20 minutes)

KASCADE was an air-shower detector located in Karlsruhe Institute of Technology. It consisted of scintillating detectors which were arranged in a 16×16 grid and recorded signals from secondary particles of air-showers. Data has been acquired from 1996 till 2013 and then has been made available online. Our goal is to find out, whether we can accurately reconstruct the initial particle by that data from the ground level. At the current stage of our work we use CORSIKA simulations of this experiment, getting data for 5 mass groups of particles and training our classifiers on them. We have tested two models: decision trees and convolutional neural network. After the training step we apply our models to the data from the real KASCADE experiment and check the credibility of the predicted particles distribution. Contrary to decision trees, the CNN are more sensitive to irregularities in the raw data and thus the data have to be preprocessed in term of application of additional quality cuts. In this talk we present the performance of developed classifiers and show our progress in preparation of the raw data for CNN.

Type of Contribution

talk

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Session Classification: Thursday