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# Towards mass composition study with KASCADE using deep neural networks

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We present the new insight into our ongoing mass composition analysis based on KASCADE archive data using deep neural networks. The archive consists of ˜300M air shower events detected by a 16x16 array of scintillating detectors and spans from 1996 to 2013. Our goal is to reconstruct the initial particle from that data accurately. We introduced five mass groups; thus, the reconstruction process could be interpreted as a classification task.

Aside from decision trees, we have engineered multiple promising neural network architectures - self-attention perceptrons, visual transformers, and convolutional neural networks. These models are being trained on CORSIKA simulations; we thoroughly examined the behavior of our models on different hadronic simulations and performed multiple sanity checks. We also check the credibility of our models with a small “unblinded” part of real KASCADE data.

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