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A Deep Learning approach to LHCb Calorimeter reconstruction using a Cellular Automaton

The optimization of reconstruction algorithms has become a key aspect in LHCb as it is currently undergoing a major upgrade that will considerably increase the data processing rate. Aiming to accelerate the second most time consuming reconstruction process of the trigger, we propose an alternative reconstruction algorithm for the Electromagnetic Calorimeter of LHCb. Together with the use of deep learning techniques and the understanding of the current algorithm, our proposal decomposes the reconstruction process into small parts that benefit the generalized learning of small neural network architectures and simplifies the training dataset. This approach takes as input the full simulation data of the calorimeter and outputs a list of reconstructed clusters in a nearly constant time without any dependency in the event complexity.

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