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A Full Detector Description Using Neural Network Driven Simulation.

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The abundance of data arriving in the new runs of the Large Hadron Collider creates tough requirements for the amount and consecutively speed of simulation generation. Current approaches can suffer from long generation time and lack of important storage resources to preserve the simulated datasets. The development of the new fast generation techniques is thus crucial for the proper functioning of experiments. We present a novel approach to simulate LHCb detector events using generative machine learning algorithms and other statistical tools. The approaches combine the speed and flexibility of neural networks and encapsulates knowledge about the detector in the form of statistical patterns. Whenever possible, the algorithms are trained using real data, which enhances their robustness against differences between real data and simulation. We discuss particularities of neural network detector simulation implementations and corresponding systematic uncertainties.

Collaboration

LHCb

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