Contribution submission to the conference Dortmund 2021

Fast Simulation of High Granularity Calorimeters with Deep Generative Models — •PETER MCKEOWN — DESY, Hamburg, Germany

Simulation is a key corner stone of modern high energy physics experiments- not only to characterise and optimise the design of detectors, but also to investigate the compatibility of experimental observations and theoretical models. Monte Carlo techniques provide a powerful method to build simulation tools, however these simulations require a large amount of compute time and will prove to be a major bottleneck at the high luminosity phase of the LHC and for future colliders. A particularly time consuming part of simulation involves calorimeter showers, which require a large number of computations to be performed to account for the many interactions that occur.

Deep generative models provide a promising solution to reduce the computing time for such simulations. Recent work in our group has demonstrated the ability to reproduce physically realistic showers in highly granular calorimeters with a high degree of fidelity. While this work focused on the specific case of a particle entering orthogonally to the calorimeter face, in order for such a simulation scheme to be used in practice, arbitrary angles of incidence must be incorporated and correctly simulated. This talk will describe the principles of using generative networks for accurate particle shower simulations and then focus on the efforts of adding conditioning on the particle incident angle.

Part:	Т
Туре:	Vortrag;Talk
Topic:	9.02 Datenanalyse,
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