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Fine Tuning of Generative Models for the Fast Simulation

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The goal to obtain more precise physics results in current collider experiments drives the plans to significantly increase the instantaneous luminosity collected by the experiments. The increasing complexity of the events due to the resulting increased pileup requires new approaches to triggering, reconstruction, analysis, and event simulation. The last task brings to a critical problem: generating the significantly higher amount of Monte Carlo (MC) data, required for analysis of the data collected at higher collider luminosity, without a drastic increase in computing resources requires a significant speedup of the simulation algorithms.
The largest part of computer resources in simulation is currently spent in the detailed GEANT modeling of particles interacting with the material of the experimental apparatus, in particular, the shower development in electromagnetic and hadronic calorimeters.
To accelerate these computations approaches based on methods of sample creation by generative models may be used.
However, those properties and behaviours that are most important for the validity of generated data are sometimes not those for which the model mostly cares.
In this contribution, we discuss possible approaches to making model sensitive to those properties that are most important for generated objects from the physics perspective.
Practical cases will be presented to illustrate these approaches.

Consider for promotion

No

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