Contribution ID: **118** Type: **Poster (from contributed talk)**

Modeling N_{ch} distributions and p_{T} spectra in high-energy pp collisions with DNNs - Poster

Wednesday 31 January 2024 17:05 (5 minutes)

During the data-taking campaigns Run 1 and Run 2 of the Large Hadron Collider (LHC), the ALICE collaboration collected a large amount of proton-proton (pp) collisions across a variety of center-of-mass energies ($\sqrt{s}$). This extensive dataset is well suited to study the energy dependence of particle production. Deep neural networks (DNNs) provide a powerful regression tool to capture underlying multidimensional correlations inherent in the data. In this contribution, DNNs are used to parameterize recent ALICE measurements of charged-particle multiplicity (N_{ch}) distributions and transverse momentum (p_{T}) spectra. The model architectures are defined and validated using a Bayesian-Optimization hyperparameter search on PYTHIA simulations for a wide $\sqrt{s}$ range and then trained on the ALICE data. An ensemble method is used to predict the observables of interest, extrapolating the measurements towards higher N_{ch} and p_{T} values as well as to unmeasured $\sqrt{s}$ from 0.5 to 100 TeV. We demonstrate that the predicted p_{T} spectra can serve as a reference for future heavy-ion measurements, e.g. the O–O campaign planned in LHC Run 3, where no dedicated pp data-taking at the same $\sqrt{s}$ is currently foreseen.

Would you like to be considered for an oral presentation?

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Session Classification: Poster Session

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