Contribution ID: **30** Type: **Poster**

Machine learning approaches for parameter reweighting in MC samples of top quark production in CMS

Wednesday, 31 January 2024 15:30 (5 minutes)

In particle physics, Monte Carlo (MC) event generators are needed to compare theory to the measured data. Many MC samples have to be generated to account for theoretical systematic uncertainties, at a significant computational cost. Therefore, the MC statistic becomes a limiting factor for most measurements and the significant computational cost of these programs a bottleneck in most physics analyses. In this contribution, the Deep neural network using Classification for Tuning and Reweighting (DCTR) approach is evaluated for the reweighting of two systematic uncertainties in MC simulations of top quark pair production within the CMS experiment. DCTR is a method, based on a Deep Neural Network (DNN) technique, to reweight simulations to different model parameters by using the full kinematic information in the event. This methodology avoids the need for simulating the detector response multiple times by incorporating the relevant variations in a single sample.

Primary author: GUGLIELMI, Valentina (Deutsches Elektronen-Synchrotron (DE))

Co-authors: LIPKA, Katerina (Deutsches Elektronen-Synchrotron (DE)); AMOROSO, Simone (Deutsches Elektronen-Synchrotron (DE))

Presenter: GUGLIELMI, Valentina (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Poster Session

Track Classification: 3 ML for simulation and surrogate model : Application of Machine Learning to simulation or other cases where it is deemed to replace an existing complex model