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Performance of the CNN-based tau identification algorithm with Domain Adaptation using Adversarial Machine Learning for Run 2

Tuesday 5 November 2024 17:20 (20 minutes)

Precise tau identification is a crucial component for many studies targeting the Standard Model or searches for New Physics within the CMS physics program. The Deep Tau v2.5 algorithm is a convolutional neural network algorithm: an improved version of its predecessor, Deep Tau v2.1, deployed for the LHC Run 3. This updated version integrates several enhancements to improve classification performance, including domain adaptation techniques, expanded datasets, and improved feature standardization, hyperparameter optimization, and data balancing. These improvements make the model more robust against potential discrepancies between data and simulation that would lead to a bias in the training. The enhancements result in a notable improvement in accuracy, with Deep Tau 2.5 achieving approximately a 30% reduction in background contributions with respect to its predecessor

Track

Tagging (Classification)

Authors: LIAO, Hongbo (Chinese Academy of Sciences (CN)); LAVORYK, Olha (KIT - Karlsruhe Institute of Technology (DE))

Presenter: LAVORYK, Olha (KIT - Karlsruhe Institute of Technology (DE))

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