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Mind the Gap: Safely Navigating Inference through Transport Maps

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Machine Learning has enabled enormous gains in sensitivity at the LHC and beyond. Much of this progress has relied on excellent simulations of a wide range of processes. However, due to the sophistication of modern machine learning algorithms, discrepancies between simulation and experimental data can significantly limit their effectiveness.
In this work, we present a novel calibration approach based on optimal transport, which enables continuous calibration of high-dimensional simulations.
We demonstrate the performance of our approach through jet tagging, using a CMS-inspired dataset.
Our method can correct a 128-dimensional jet representation learned from a general-purpose classifier.
Using this calibrated high-dimensional representation, powerful new applications of jet flavor information can be utilized in LHC analyses.
This continuous calibration framework also serves as a guide for deriving high-dimensional corrections of continuous distributions via transportation maps, with applications across the sciences.

Secondary track

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