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Invariant Representation Driven Neural Classifier for Anti-QCD Jet Tagging

Wednesday, 11 May 2022 15:55 (5 minutes)

We leverage representation learning and the inductive bias in neural-net-based Standard Model jet classification tasks, to detect non-QCD signal jets. In establishing the framework for classification-based anomaly detection in jet physics, we demonstrate that with a \emph{well-calibrated} and \emph{powerful enough feature extractor}, a well-trained \emph{mass-decorrelated} supervised Standard Model neural jet classifier can serve as a strong generic anti-QCD jet tagger for effectively reducing the QCD background. Imposing \emph{data-augmented} mass-invariance (decoupling the dominant factor) not only facilitates background estimation, but also induces more substructure-aware representation learning. We are able to reach excellent tagging efficiencies for all the test signals considered. This study indicates that supervised Standard Model jet classifiers have great potential in general new physics searches.
(https://arxiv.org/abs/2201.07199)

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