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Metrics and Machine Learning Algorithms for Collider Space

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When the space of collider events is equipped with a metric, many simple-to-use machine learning algorithms can be applied to perform the task of jet tagging. Here we explore several different generalizations of the Energy Mover's Distance. The computed distance matrices are fed into both supervised and unsupervised learning models, and their performances in distinguishing various types of jets are quantified and compared. This in turn offers an estimate on the suitability of the metrics themselves for the underlying event space at hand, aiding the selection of the most appropriate metric-model pair. The framework thus paves the way for future applications of metric-based machine learning for collider physics.

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