

Generating parton-level events from reconstructed events with Conditional Normalizing Flows

Thursday 1 February 2024 16:15 (5 minutes)

We introduce a new approach using generative machine learning to sample meaningful generator-level events given reconstructed events in the CMS detector. Our method combines Transformers and Normalizing Flows to tackle the challenge of integrating the Matrix Element Method with importance sampling. We propose using a Transformer network to analyze the full reconstructed event and extract latent information, which is then used to condition a Normalizing Flow network. This approach enables the generation of probable sets of partons that are compatible with observed objects. We demonstrate the performance of our approach on a complex final state, like $t\bar{t}H(bb)$ in the semileptonic decay channel, and discuss potential applications.

Would you like to be considered for an oral presentation?

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Session Classification: Poster Session

Track Classification: 2 ML for analysis : event classification, statistical analysis and inference, including anomaly detection