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Probing intractable BSM parameter spaces armed with Machine Learning

This research introduces an innovative machine learning (ML)-assisted nested sampling approach aimed at exploring Beyond the Standard Model (BSM) parameter spaces more efficiently. Traditional methods like Markov Chain Monte Carlo (MCMC) and Hamiltonian Monte Carlo (HMC) often face limitations in high-dimensional, multi-modal spaces, leading to computational bottlenecks. Our method combines actively trained deep neural networks (DNNs) with nested sampling, dynamically predicting higher-likelihood regions to accelerate convergence and improve sampling accuracy. This scalable framework holds promise for addressing computational challenges in high-energy physics (HEP) research, offering a comprehensive solution for BSM parameter analysis.

Field of contribution

Phenomenology

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Track Classification: Beyond the standard model