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Latest improvements to CATHODE

Wednesday 21 May 2025 14:20 (20 minutes)

The search for physics beyond the Standard Model remains one of the primary focus in high-energy physics. Traditional searches at the LHC analyses, though comprehensive, have yet to yield signs of new physics. Anomaly detection has emerged as a powerful tool to widen the discovery horizon, offering a model-agnostic path as way to enhance the sensitivity of generic searches not targeting any specific signal model. One of the leading methods, CATHODE - Classifying Anomalies THrough Outer Density Estimation (arXiv:2109.00546) is a two-step anomaly detection framework that constructs an in-situ background estimate using a generative model, followed by a classifier to isolate potential signal events.
We present the latest developments to the CATHODE method, aimed to increase its robustness broadening its applicability. These improvements expand its reach to new topologies with new input variables covering all particles in the event.

Would you like to be considered for an oral presentation?

Yes

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