Phenomenology 2022 Symposium: From Virtual to Real



Contribution ID: 207

Type: not specified

Classifying Anomalies THrough Outer Density Estimation

Tuesday 10 May 2022 14:00 (15 minutes)

Despite countless searches at the Large Hadron Collider (LHC), new physics remains elusive. The majority of these searches are highly model specific, requiring both background and signal simulation. In recent years, many anomaly detection methods have been proposed that use machine learning to enhance resonance searches without specifying a particular signal hypothesis. In this talk, I will present CATHODE (Classifying Anomalies THrough Outer Density Estimation), a novel model agnostic anomaly detection method built on the combination of neural density estimation and classification. I will show that it significantly outperforms all previous approaches aiming to enhance bump hunt searches, and that it achieves the best possible performance on the well-studied LHC Olympics R&D dataset. CATHODE represents a major step forward in the field of anomaly detection for high energy physics and will significantly enhance the breadth and sensitivity of searches at the LHC and beyond.

Author: HALLIN, Anna Presenter: HALLIN, Anna Session Classification: Tools II