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Kernel density estimation and weakly supervised machine learning-based models for Higgs-like signals data classification

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Following the anomaly observed in multi-lepton final states through the decays of heavy scalar resonance in ⬚⬚ data at the Large Hadron Collider via proton-proton collisions, we develop a Kernel density estimation-based machine learning model to generate synthetic dataset. The dataset comprises SM Higgs-like signals such as ggF, VBF, WH and ZH. Further we use weak supervised machine learning methods and deep neural network model(s) to classify and discriminate between original and synthetic dataset. We demonstrate the ability of this approach to reproduce the various kinematic observables in the said final states, and preliminary results shows that this model generates the synthetic data reasonably well, where the performance is compared with the standard samples using Monte-Carlo event generators.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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