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Deep learning approaches to the Higgs boson self coupling

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Deep learning has been applied to many studies in high energy physics with substantial improvement over the traditional selection-cut methods. Based on deep-learning approaches, we perform a comprehensive signal-background analysis for Higgs-pair production in $HH \rightarrow b\bar{b}\gamma\gamma$ channel at the HL-LHC, with the goal of probing the self-coupling λ_{3H} of the Higgs boson. We show that the multi-class classification using Deep Neural Network can indeed give better performance in disentangling signal and backgrounds.

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