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Feasibility of Implementing Machine Learning into the CMS Trigger System for Improved Studies of the Higgs Boson[1] MATTHEW LITTON, DAVID SPERKA, Boston Univ, CMS COLLABORATION — Machine Learning is a rapidly expanding field, with growth not only in industry settings, but in High Energy Physics applications as well. Machine learning techniques have already proven useful at the LHC in some settings. Moreover, recent advancements in software tools make it possible to synthesize neural nets into field programmable gate array (FPGA) firmware and improvements in hardware capabilities have allowed for a renewed effort to integrate machine learning into a wider swath of the LHC. To this end, we proceeded to investigate if the inclusion of a machine learning algorithm would improve the performance of the hardware trigger menu for Vector Boson Fusion (VBF) signal topologies. Our research has shown that a deep neural network (DNN) structure can already achieve a significant performance increase over the standard 'cut based' trigger designs. In this poster, we will present the details of our results, the training design, and our current efforts to both improve performance and expand our DNN to trigger on more VBF Higgs topologies.

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