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fwXmachina part 1: Classification with boosted decision trees on FPGA for L1 trigger

Monday 25 September 2023 16:15 (15 minutes)

We introduce the fwXmachina framework for evaluating boosted decision trees on FPGA for implementation in real-time systems. The software and electrical engineering designs are introduced, with both physics and firmware performance detailed. The test bench setup is described. We present an example problem in which fwXmachina may be used to improve the identification of vector boson fusion Higgs production at the L1 triggers in LHC experiments. Comparisons are made to previous results, including comparisons to neural network approaches. The talk describes work in JINST 16 P08016 (2021), [2104.03408], as well as more recent results.

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