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# Nanosecond machine learning with BDT for high energy physics

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We present a novel implementation of classification using boosted decision trees (BDT) on field programmable gate arrays (FPGA). Two example problems are presented, in the separation of electrons vs. photons and in the selection of vector boson fusion-produced Higgs bosons vs. the rejection of the multijet processes. The firmware implementation of binary classification requiring 100 training trees with a maximum depth of 4 using four input variables gives a latency value of about 10ns. Implementations such as these enable the level-1 trigger systems to be more sensitive to new physics at high energy experiments. The work is described in [2104.03408].

## Are you are a member of the APS Division of Particles and Fields?

Yes

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