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Machine learning based developments for LHC level-1 triggers

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Machine learning based developments made for the level-1 trigger of the CMS experiment at LHC, both for Run-3 and HL-LHC eras will be presented. Unsupervised anomaly detection models are used in CICADA and AXOL1TL implementations using high-level synthesis on Xilinx Virtex-7 based boards for Run-3 running at full LHC clock rate digesting every bunch crossing within level-1 trigger latency budget. Models for both pattern recognition in level-1 trigger and anomaly detection based triggers planned for the HL-LHC era in larger FPGAs will also be described. The hardware characteristics, the firmware strategies and ML model adaptation to FPGA-environment will be discussed.

Early Career

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