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Fast and resource-efficient Deep NN on FPGAs for the Phase-II L0 Muon Barrel Trigger of the ATLAS Experiment

Thursday 7 November 2019 11:30 (15 minutes)

The Level-0 Muon Trigger system of the ATLAS experiment will undergo a full upgrade for HL-LHC to stand the challenging performances requested with the increasing instantaneous luminosity. The upgraded trigger system foresees to send RPC raw hit data to the off-detector trigger processors, where the trigger algorithms run on new generation of Field-Programmable Gate Arrays (FPGAs). The FPGA represents an optimal solution in this context, because of its flexibility, wide availability of logical resources and high processing speed.
We have developed novel precision deep neural network architectures based on trained ternary quantization, optimised to run on FPGAs, and trained it for efficient reconstruction and identification of muons in the ATLAS level-0 trigger. Both physics performance in terms of efficiency and fake rates, and FPGA logic resource occupancy and timing obtained with the developed algorithms will be presented.

Consider for promotion

No

Authors: SHAW, Savanna Marie (University of Manchester); GIAGU, Stefano (Sapienza Universita e INFN, Roma I (IT))

Presenter: GIAGU, Stefano (Sapienza Universita e INFN, Roma I (IT))

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