

Realtime Auto encoder based Anomaly Detection to trigger for new physics at the CMS experiment

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The Compact Muon Solenoid (CMS) experiment at the Large Hadron Collider (LHC) features a sophisticated two-level triggering system composed of the Level 1 (L1), instrumented by custom-design hardware boards, and the High-Level software based trigger (HLT). The CMS L1 Trigger receives information from calorimeters and muon detectors. Recently, a new system, called CICADA (Calorimeter Image Convolutional Anomaly Detection Algorithm), was deployed. The CICADA system was added to existing calorimeter trigger system and is implemented on Xilinx's Virtex7 based FPGAs. Its decision based on anomaly detection algorithm consisting of auto encoders and is aimed to trigger on event signatures consistent with new physics. The algorithm is working in extremely challenging environment selecting events in real time. We present the status of CICADA commissioning and its preliminary physics results.

Track type

Collider and BSM Physics

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