Contribution ID: **1129**   Type: **Parallel session talk**

Realtime Anomaly Detection at the L1 Trigger of CMS Experiment

Friday 19 July 2024 12:10 (17 minutes)

We present the preparation, deployment, and testing of an autoencoder trained for unbiased detection of new physics signatures in the CMS experiment Global Trigger (GT) test crate FPGAs during LHC Run 3. The GT makes the final decision whether to readout or discard the data from each LHC collision, which occur at a rate of 40 MHz, within a 50 ns latency. The Neural Network makes a prediction for each event within these constraints, which can be used to select anomalous events for further analysis. The GT test crate is a copy of the main GT system, receiving the same input data, but whose output is not used to trigger the readout of CMS, providing a platform for thorough testing of new trigger algorithms on live data, but without interrupting data taking. We describe the methodology to achieve ultra low latency anomaly detection, and present the integration of the DNN into the GT test crate, as well as the monitoring, testing, and validation of the algorithm during proton collisions.

Alternate track

1. Operation, Performance and Upgrade (incl. HL-LHC) of Present Detectors

I read the instructions above

Yes

Authors: GANDRAKOTA, Abhijith (Fermi National Accelerator Lab. (US)); CMS

Presenter: GANDRAKOTA, Abhijith (Fermi National Accelerator Lab. (US))

Session Classification: Computing and Data handling

Track Classification: 14. Computing, AI and Data Handling