Contribution ID: **8**   Type: **Contributed talk**

Convolutional pile-up suppression in the ATLAS Global Trigger

Tuesday 20 May 2025 14:40 (20 minutes)

We describe a PU-suppression algorithm for the Global trigger using convolutional neural networks. The network operates on cell towers, exploiting both cluster topology and E_T to correct for the contribution of PU. The algorithm is optimised for firmware deployment, demonstrating high throughput and low resource usage. The small size of the input and lightweight implementation enable a high degree of scalability and parallelisation. We benchmark the physics performance of our algorithm by reconstructing and calibrating small-R central jets, and comparing to a range of existing algorithms. Trigger rates and thresholds are estimated, with the CNN producing the lowest thresholds for central multi-jet, jet H_T and E_T^{miss} triggers. We apply these thresholds to an SM VBF $HH \rightarrow b\bar{b}b\bar{b}$ sample and find that the highest acceptance is obtained using our algorithm.

Would you like to be considered for an oral presentation?

Yes

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Session Classification: Contributed Talks

Track Classification: 5 Fast ML: Application of ML to DAQ/Trigger/Real Time Analysis/Edge Computing