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Towards Online Machine Learning in DUNE Data Acquisition

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Processing large volumes of sparse neutrino interaction data is essential to the success of liquid argon time projection chamber (LArTPC) experiments such as DUNE. High rates of radiological background must be eliminated to extract critical information for track reconstruction and downstream analysis. Given the computational load of this rejection, and potential real time constraints of downstream analysis for certain physics applications, we propose the integration of machine learning based online data filtering into DUNE's data acquisition (DAQ) software through the Services for Optimized Network Inference on Coprocessors (SONIC) framework. This talk presents the current status of data processing methods for online data filtering within DUNE-DAQ. We show the status of implementing the NVIDIA Triton client-server model into DUNE DAQ, and compare directly to a real-time FGPA-based implementation from raw WIB readout data. We use the physics case of supernova pointing to benchmark the signal efficiency, latency, and throughput of our ML algorithms under various input and hardware configurations.

Focus areas

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