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An Intermediate Level Supernova Pointing Trigger for DUNE Using In-storage AI

Thursday 25 April 2024 10:00 (20 minutes)

One of the main goals of the Deep Underground Neutrino experiment (DUNE) is to detect and study neutrinos from galactic core-collapse supernovas (SNs). In the baseline design, a SN trigger is generated upon detecting sufficient detector activity consistent with a SN candidate. This causes roughly 0.5PB of raw data to be buffered in the underground caverns, as they await network transfer back to Fermilab, lasting several hours. During this time, no attempt is made to determine the direction of the SN. In this talk, we present a new approach that uses in-storage AI implemented on FPGAs to process and reduce the buffered SN data in situ, followed by a fast offline-like workflow that determines the direction of the SN on a timescale useful for optical follow-ups. Apart from making this fast pointing capability possible for the first time, it will greatly impact DUNE's offline data storage requirements in a positive way.

Minioral

No

IEEE Member

No

Are you a student?

No

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Track Classification: Data Acquisition and Trigger Architectures