Contribution ID: **80** Type: **not specified**

Accelerating Graph-based Tracking Tasks with Symbolic Regression

Wednesday 6 November 2024 14:30 (20 minutes)

Reconstructing particle tracks from detector hits is computationally intensive due to the large combinatorics involved. Recent work has shown that ML techniques can enhance conventional tracking methods, but complex models are often difficult to implement on heterogeneous trigger systems, such as FPGAs. While deploying neural networks on FPGAs is possible, resource limitations pose challenges. As an alternative, we propose using symbolic regression (SR) to replace graph-based neural networks. This approach maintains the graph structure and enables message passing, making it more suitable for heterogeneous hardware. SR is easier to implement on FPGAs and offers faster execution on CPUs compared to traditional methods. Though demonstrated for tracking, this method provides a proof-of-concept applicable to various use cases.

Track

Reconstruction

Author: SOYBELMAN, Nathalie (Weizmann Institute of Science (IL))

Co-authors: SCHIAVI, Carlo (INFN e Universita Genova (IT)); GROSS, Eilam (Weizmann Institute of Science (IL)); DI BELLO, Francesco Armando (INFN e Universita Genova (IT))

Presenter: SOYBELMAN, Nathalie (Weizmann Institute of Science (IL))

Session Classification: Reconstruction