Contribution ID: **1115** Type: **Parallel Talk**

Optimization and Evaluation of Edge Classifying GNNs for Charged Particle Tracking

Friday, 8 July 2022 18:30 (15 minutes)

The determination of charged particle trajectories in collisions at the CERN Large Hadron Collider (LHC) is an important but challenging problem, especially in the high interaction density conditions expected during the future high-luminosity phase of the LHC (HL-LHC). Graph neural networks (GNNs) have been successfully applied to this problem by representing tracker hits as nodes in a graph, creating graph edges for possible track segments, classifying the edges are true or false, and applying clustering on the classified edges to produce track candidates. Building off our recent work developing GNNs for tracking, we present additional studies aimed at identifying the most accurate and efficient GNN tracking pipeline. In particular, we compare two different edge classifying GNNs, explore hyperparamter optimization of the models, evaluate the impact of different graph construction methods on overall track finding performance, and implement different track-fitting mechanisms for GNN-identified track candidates. We also compare the performance of these GNN models to current Kalman filter-based tracking methods.

In-person participation

Yes

Primary authors: Mr DEZOORT, Gage (Princeton); THAIS, Savannah (Princeton University); OJALVO, Isobel; DUARTE, Javier; NEUBAUER, Mark; ATKINSON, Markus (markus.atkinson@cern.ch)

Presenter: THAIS, Savannah (Princeton University)

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