

A geometric deep learning algorithm for charged-particle track reconstruction in the ATLAS ITk

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The upcoming HL-LHC represents a steep increase in the average number of pp interactions and hence in the computing resources required for offline track reconstruction of the ATLAS Inner Tracker (ITk). Track pattern recognition algorithms based on Graph Neural Networks (GNNs) have been demonstrated as a promising approach to these challenges. We present in this contribution a novel algorithm developed for track reconstruction in silicon detectors based on a number of deep learning techniques including GNN architectures. Using simulated ttbar events on the latest ITk geometry, we demonstrate the performance of our algorithm, and compare to that of the tracking algorithm currently used. In addition, the tracking performance on single charged particles is studied in detail. Finally, we discuss the algorithm's computational performance and optimisations that reduce computing costs, as well as our effort to integrate into the ATLAS analysis software for full-chain testing and production.

Alternate track

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Yes

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