

## Connecting The Dots 2023



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# Novel Approaches for ML-Assisted Particle Track Reconstruction and Hit Clustering

*Thursday, 12 October 2023 10:00 (25 minutes)*

Track reconstruction is a vital aspect of High-Energy Physics (HEP) and plays a critical role in major experiments. In this study, we delve into unexplored avenues for particle track reconstruction and hit clustering. Firstly, we enhance the algorithmic design by utilizing a “simplified simulator” (REDVID) to generate training data that is specifically designed for simplicity. We demonstrate the effectiveness of this data in guiding the development of optimal network architectures.

Additionally, we investigate the application of image segmentation networks for this task, exploring their potential for accurate track reconstruction. Moreover, we approach the task from a different perspective by treating it as a hit sequence to track sequence translation problem. Specifically, we explore the utilization of Transformer architectures for tracking purposes. By considering this novel approach, we aim to uncover new insights and potential advancements in track reconstruction.

Through our comprehensive exploration, we present our findings and draw conclusions based on the outcomes of our investigations. This research sheds light on previously unexplored avenues and provides valuable insights for the field of particle track reconstruction and hit clustering in HEP.

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