

Connecting The Dots 2023



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Track Finding-and-Fitting with Influencer Object Condensation

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ML-based track finding algorithms have emerged as competitive alternatives to traditional track reconstruction methods. However, a major challenge lies in simultaneously finding and fitting tracks within a single pass. These two tasks often require different architectures and loss functions, leading to potential misalignment. Consequently, achieving stable convergence becomes challenging when incorporating both finding and fitting in a multi-task loss framework.

To address this issue, we propose to use a solution called object condensation, which aims to find a representative point for track building while serving as the target for parameter regression. Specifically, we leverage the recently-introduced Influencer approach, where each hit can act as both a representative and a representee, which has been shown to allow robust track building. In this work, we present the results obtained by utilizing the Influencer model for the combined track finding-and-fitting task. We evaluate the performance benefits of treating fitting as an auxiliary task to enhance track finding and compare the physics performance and resource utilization against the typical sequential finding-then-fitting pipeline.

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