

Local strategy of particle tracking with TrackNETv2 on the BES-III CGEM inner detector

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The BESIII experiment is a multi-purpose detector operating at the beams of the electron-positron collider BEPCII in Beijing. Particle tracking is a fundamental part of data analysis for this experiment. The inner part of the BESIII tracker suffers from a strong beam-related background, which significantly reduces tracking efficiency for low-pT tracks and the physics performance of the experiment. The inner part of the tracker will be replaced with the CGEM detector, which is expected to have a better performance in the presence of a strong background. At the same time, it will produce a large number of fake hits. Traditional algorithmic solutions rely on hand-engineered features and metrics, do not parallelize easily, and scale poorly with detector occupancy. In this paper we present our solution for identification and reconstruction of tracks based on deep neural network called TrackNETv2. This model is lightweight, efficient and can be trained using Monte-Carlo simulation. TrackNETv2 was proposed for another experiment BM@N and proved its usefulness for task of particle tracking. Due to architectural restrictions we added some new blocks for this model developing it to TrackNetv2.1. In this paper we evaluated these ideas on simulated data and discussed its strengths and limitations for application in the BESIII tracking challenge.

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