

Numerical Optimization for Fast Track Finding Based on the Artificial Retina Algorithm

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High-energy physics experiments rely on reconstruction of the trajectories of particles produced at the interaction point. This is a challenging task, especially in the high track multiplicity environment generated by p-p collisions at the LHC energies. A typical event includes hundreds of signal examples (interesting decays) and a significant amount of noise (uninteresting examples).

This work describes a modification of Artificial Retina Algorithm for fast track finding: numerical optimization methods were adopted for fast local track search. This approach allows for considerably reduction of the total computational time per event. Test results on simplified simulated model of LHCb VELO (Vertex Locator) detector are presented. Also this approach is well-suited for implementation for paralleled computations as GPU which looks very attractive in the context of upcoming detector upgrade.

Tertiary Keyword (Optional)

Algorithms

Secondary Keyword (Optional)

Reconstruction

Primary Keyword (Mandatory)

Artificial intelligence/Machine learning

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