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Study of Retina Algorithm on FPGA for Fast Tracking

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Real-time track reconstruction in high energy physics experiments at colliders running at high luminosity is very challenging for trigger systems. To perform pattern-recognition and track fitting, artificial Retina or Hough transformation algorithms have been introduced in the field which have usually to be implemented in the state of the art FPGA devices. In this paper we report on two possible FPGA implementations of the retina algorithm: one using online Floating-Point core and one using Look-up Table and fixed-point representation. Detailed measurements of the performance on hardware designs, including latency, FPGA resource and physics performance are investigated and compared. So far the Retina has mainly be used in a detector configuration made of parallel planes, without or with small magnetic field. In this note we also report on the simulated performance in a detector configuration made of concentric detection layers with high magnetic field.

Minioral

Yes

Description

Fast Tracking

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