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Z-vertex Track Trigger operation in 2021 for Belle II - a hardware perspective

Tuesday, 30 November 2021 18:00 (20 minutes)

The z-vertex track trigger estimates the collision origin in the Belle II experiment using neural networks to reduce the background. The main part is a pre-trained multilayer perceptron. The task of this perceptron is to estimate the z-vertex of the collision to suppress background from outside the interaction point. For this, a low latency real-time FPGA implementation is needed. We present an overview of the architecture and the FPGA implementation of the neuronal network and the preprocessing. We also show the hardware preprocessing handling of missing input data with specially trained neuronal networks. For this, we will show the results of the z-vertex estimation and the latency for the implementation in the Belle II trigger system. Plans for a major update, for the preprocessing, with a 3D Hough transformation processing step is ongoing and will be presented.

Significance

This will be the first presentation with the Z-vertex track trigger working actively in the Belle II Level 1 trigger process. For this purpose, the hardware adaptations for the single track trigger are shown for the first time.

References

Speaker time zone

Compatible with Europe

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