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First prototype of a silicon tracker using an 'artificial retina' for fast track finding

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We report on the R&D for a first prototype of a silicon tracker with trigger capabilities based on a novel approach for fast track finding. The working principle is inspired from neurobiology, in particular by the processing of visual images by the brain as it happens in nature. It is based on extensive parallelization of data distribution and pattern recognition. In this work we report on the design of a practical device that consist of a telescope based on single-sided silicon detectors; we describe the data acquisition system and the implementation of the track finding algorithms using available digital logic of commercial FPGA devices. Tracking performance and trigger capabilities of the device are discussed along with perspectives for future applications.

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