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LOOT: Novel end-to-end trainable convolutional neural network for particle track reconstruction

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We introduce a radically new approach to the particle track reconstruction problem for tracking detectors of HEP experiments. We developed the end-to-end trainable YOLO-like convolutional neural network named Look Once On Tracks (LOOT) which can process the whole event representing it as an image, but instead of three RGB channels, we use, as channels in depth, discretized contents of sequential detector coordinate stations. The LOOT neural net avoids all problems of the existing sequential tracking algorithms because it does computations in one shot. The first results of the algorithm's application to the data from the Monte-Carlo simulations are presented and discussed.

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Keywords: tracking, GEM detector, YOLO, convolutional neural network, particle track reconstruction

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