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Track reconstruction in high density environment

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Tracks finding and fitting algorithm in ALICE Time projection chamber (TPC) and Inner Tracking System (ITS)
based on the Kalman-filtering are presented. The filtering algorithm is able to cope with non-Gaussian noise and ambiguous measurements in high-density environments. The tracking algorithm consists of two parts: one for the TPC and one for the prolongation into the ITS. The occupancy in the TPC can reach up to 40 %. Usually, due to the overlaps, a number of points along the track are lost or significantly displaced.
At first the clusters are found and the space points are reconstructed. The shape of a cluster provides information about the overlap. An unfolding algorithm is applied for points with distorted shapes. Then, the expected space point error is estimated using information about the cluster shape and track parameters. Further, the available information about local track overlap is used.
In the TPC-ITS matching, the distance between the TPC and the ITS sensitive volume is rather large and the track density inside the ITS is so high that the straightforward continuation of the tracking procedure is ineffective. Using only chi2 minimisation there is a high probability of assigning a wrong hit to the track. Therefore for each TPC track a candidate tree of the possible track prolongation in the ITS is build. Finally the
most probable track candidates are chosen.
The approach have been implemented within the ALICE simulation/reconstruction framework (ALIROOT), and
algorithm's efficiency have been estimated using the ALIROOT Monte Carlo data.

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