

Tracking of UWB Multipath Components Using Probability Hypothesis Density Filters

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Abstract:

In multipath assisted indoor navigation and tracking (MINT), individual multipath components (MPCs) of the ultra wideband (UWB) channel need to be extracted. A sequential Monte-Carlo based implementation of the multi-source multitarget probability density (PHD) filter is used in order to jointly estimate the number of multipath components present as well as their individual parameters. The PHD-Filter is able to model the changing visibility of individual multipath components along a measurement trajectory. As the PHD-Filter does not maintain target track continuity, a path-labelling method is used to keep track of the MPCs. The performance is evaluated with UWB measurements obtained in an indoor scenario. Despite the high amount of diffuse multipath present in the measurements, the PHD-Filter is able to detect most of the MPCs compared to the groundtruth. Track continuity is maintained for several succeeding positions of the mobile along the measurement trajectory.