Real-Time Demonstration of Multipath-Assisted Indoor Navigation and Tracking (MINT)

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Abstract:

This paper presents an evaluation of a demonstration system for multipath-assisted indoor navigation and tracking (MINT). MINT overcomes the non-line-of-sight problems of range-based indoor localization systems by explicitly using location information of reflected signal components. With the real-time demonstration system, performance evaluations are possible without the need to rely on pre-recorded measurement trajectories or simulated radio channels.
Hence, the robustness and accuracy of MINT in different environments can be tested easily and a proof-of-concept in close-to-practical conditions is obtained.
Exemplary results in two diff erent rooms highlight the following key findings: The excellent performance of MINT that we reported previously based on pre-recorded measurements can also be obtained with the real-time system, i.e. 5 cm accuracy for 90% of the estimates at a bandwidth of 2 GHz. Furthermore, the covariance of the position error of the tracking filters matches well with the corresponding Cramer-Rao lower bound (CRLB).