The Need and Challenges for Ubiquitous Positioning, Navigation and Timing (PNT) Using Wi-Fi

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SUMMARY

This paper presents further results for indoor localization using Wi-Fi RSS (Received Signal Strength) measurements in a typical office environment from a one-week benchmarking measurement campaign carried out at The Ohio State University from the joint FIG/IAG Working Group on Multi-sensor Systems. Based on the paper presented at the FIG Working Week in Hanoi in 2019 significant progress in algorithm development for Wi-Fi localization is reported. Starting from an identification of the key points and challenges of ubiquitous pedestrian user localization in mass market LBS applications the novel probabilistic location fingerprinting approach demonstrates successful pedestrian user indoor localization on the room-level granularity. As for many applications, the determination of the room or a section of the building where the user is currently located is sufficient this approach is a suitable solution for challenging indoor localization problems. Matching success rates of up to 97% for the localization of a user while walking along trajectories between different cells in an office building are achieved with the new approach.