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| **Title:** | A Geolocation Approach Using UWB Deterministic Modeling for Non Line-Of-Sight Conditions | | |
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| **Abstract:** |  |
| The high time resolution characteristic of ultra-wideband (UWB) signals enables the potential of accurate ranging in line-of-sight (LOS) propagation. However, Non-line-of-sight (NLOS) propagation can cause a large error in source geolocation. In order to mitigate NLOS errors this paper proposes and investigates a noble approach which makes a hybrid combination of fingerprinting (FP) positioning and an iterative Time of Arrival (TOA) real time positioning method. Moreover, to reduce the computational complexities in FP method, we introduce a unique idea for the arrangement of reference tags to create fingerprinting database. Each arrangement of reference tags resembles a shape of polygon, which size dominates the computational complexities of FP as well as proposed hybrid method. By analyzing the tradeoff between positioning accuracies and computational complexities in proposed method we determine the appropriate size of polygon to reduce the computational complexity while maintaining a higher positioning accuracy. Finally, in comparison with FP only positioning method the proposed hybrid method yields better performance and is much more robust in NLOS condition with improved positioning accuracy in indoor environment. | |