ToA estimation enhancement for indoor MANET cooperative localization algorithms

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Abstract:

The low complexity NLoS mitigation method is proposed in order to enhance the node distance estimation based on the ToA ranging techniques. It leads to improving of the time of arrival determination of the received signal in the case of Non Line-of-Sight communication with the Undetected Direct Path. It estimates the assumed time of arrival of the missing direct path as a mean of the time delays of reflected paths. In this paper the ToA parameter estimation enhancement has been studied. The time of arrival problem is explained and also a brief survey of the LoS/NLoS identification techniques is described. The description is focused especially on techniques, which are based on the r eceived signal statistic in combination with the distribution tests. The proposed NLoS mitigation technique is implemented in the cooperative positioning algorithm based on the circular trilateration. The IEEE 802.15.4a statistical channel model has been used in order to simulate the mobile node communication in an office environment, which is the result of the research activity of the members of the Mitsubishi Electric Research Laboratories.