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An efficient distributed localisation algorithm for wireless sensor networks: based on smart reference-selection method

Adnan M. Abu-Mahfouz[1],* and Gerhard P. Hancke[2]

[1]Advanced Sensor Networks Research Group, CSIR Meraka Institute, University of Pretoria, Pretoria, South Africa

*Corresponding author: Email: a.abumahfouz@ieee.org

[2]Information Security Group, Royal Holloway, University of London, UK and University of Pretoria, South Africa
Email: ghancke@ieee.org

Abstract

Determining the location of nodes is a key part of wireless sensor networks (WSNs). Many WSN applications require knowledge of nodes' locations to perform their functions successfully. Several localisation algorithms rely on using all or most of the available references to enhance their performance. However, to implement an efficient localisation algorithm for WSNs one should reconsider this assumption. This paper introduces an efficient localisation algorithm that is based on a novel smart reference-selection method. This method chooses only those references that would increase the overall localisation accuracy, and it also minimises the number of iterations needed to refine the accuracy of the estimated position. Simulation results confirm that, compared to existing approaches, the proposed reference selection technique and associated localisation algorithm achieves both reliable and accurate position estimate using a minimal number of references. This decreases the computational burden of gathering and analysing location data from the high number of references previously believed to be necessary.