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Research Letter

Distributed Source Localization Based on TOA Measurements in Wireless Sensor Networks

Wanzhi Qiu and Efstratios Skafidas

National ICT Australia, Department of Electrical and Electronic Engineering, The University of Melbourne, Parkville, Victoria 3010, Australia

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Abstract

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Abstract

We study the problem of source localization in multihop wireless sensor networks. A fully distributed algorithm based on sensor measurements of time of arrivals (TOAs) is proposed. In contrast to centralized methods where all TOA measurements are transmitted via certain routes to a central location (the sink) for processing, the proposed method distributes the processing among the relay nodes on the routes to the sink. Fusion strategies are proposed so that the raw and intermediate data are progressively processed, and only the refined results are further relayed. As a result, the proposed scheme has improved flexibility and scalability since it does not impose any special requirements on the sink node. The proposed distributed strategy also has the potential to save energy and bandwidth due to reduced radio transmissions.