DISTRIBUTED DEPLOYMENT ALGORITHM BASED ON BOUNDARY EXPANSION AND VIRTUAL FORCE FOR MOBILE SENSOR NETWORKS

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Abstract: Optimization of sensors' position is a challenging problem in wireless sensor networks since the processing process significantly affects energy consumption, surveillance ability and network lifetime. Vectorbased algorithm (VEC) and Voronoi-based algorithm (VOR) are two existing approaches. However, VEC is sensitive to initial deployment, while VOR always moves to the coverage holes. Moreover, the nodes in a network may oscillate for a long time before they reach the equilibrium state. This paper presents an initially central deployment model that is cost effective and easy to implement. In this model, we present a new distributed deployment algorithm based on boundary expansion and virtual force (BEVF). The proposed scheme enables nodes to move to the boundary rapidly and ultimately reach equilibrium quickly. For a node, only the location of its nearby nodes and boundary information are needed in the algorithm, thereby avoiding communication cost for transmitting global information. The distance threshold is adopted to limit node movement and to avoid node oscillations. Finally, we compare BEVF with existing algorithms Results show that the proposed algorithm achieves a much larger coverage and consumes lower energy.

Key words: *Wireless sensor networks, sensor deployment, network connectivity, virtual force, boundary expansion*

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1. Introduction

Wireless sensor network [1] is an emerging technology in recent years It consists of many sensor nodes with identical or different functions. The nodes have a certain capacity in various applications such as communications, data processing

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