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Improved Network Construction Methods Based on Virtual Rails for Mobile Sensor Network

Authors : Noritaka Shigei, Kazuto Matsumoto, Yoshiki Nakashima, Hiromi Miyajima

Abstract : Although Mobile Wireless Sensor Networks (MWSNs), which consist of mobile sensor nodes (MSNs), can cover a wide range of observation region by using a small number of sensor nodes, they need to construct a network to collect the sensing data on the base station by moving the MSNs. As an effective method, the network construction method based on Virtual Rails (VRs), which is referred to as VR method, has been proposed. In this paper, we propose two types of effective techniques for the VR method. They can prolong the operation time of the network, which is limited by the battery capabilities of MSNs and the energy consumption of MSNs. The first technique, an effective arrangement of VRs, almost equalizes the number of MSNs belonging to each VR. The second technique, an adaptive movement method of MSNs, takes into account the residual energy of battery. In the simulation, we demonstrate that each technique can improve the network lifetime and the combination of both techniques is the most effective.

Keywords : mobile sensor node, relay of sensing data, residual energy, virtual rail, wireless sensor network
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