Wireless Personal Communications
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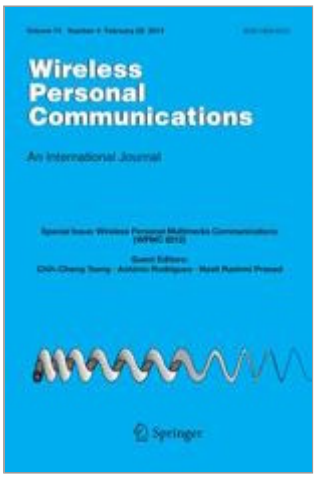
An Energy Efficient Barrier Coverage Algorithm for Wireless Sensor Networks

Abstract

Intrusion detection is one of the most important applications of wireless sensor networks. When mobile objects are entering into the boundary of a sensor field or are moving cross the sensor field, they should be detected by the scattered sensor nodes before they pierce through the field of sensor (barrier coverage). In this paper, we propose an energy efficient scheduling method based on learning automata, in which each node is equipped with a learning automaton, which helps the node to select best node to guarantee barrier coverage, at any given time. To apply our method, we used coverage graph of deployed networks and learning automata of each node operates based on nodes that located in adjacency of current node. Our algorithm tries to select minimum number of required nodes to monitor barriers in deployed network. To investigate the efficiency of the proposed barrier coverage algorithm several computer simulation experiments are conducted. Numerical results show the superiority of the proposed method over the existing methods in term of the network lifetime and our proposed algorithm can operate very close to optimal method.



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Authors

- Habib Mostafaei [1]
- Mohammad Reza Meybodi [2]

Author Affiliations

- 1. Department of Computer Engineering, Urmia Branch, Islamic Azad University, Urmia, Iran
- 2. Department of Computer Engineering, AmirKabir University of Technology, Tehran, Iran