Abstract

As wireless sensor networks (WSNs) continue to attract more and more researchers attention, new ideas for applications are continually being developed, many of which involve consistent coverage with good network connectivity of a given region of interest. One of the important challenges of the wireless sensor networks is problem of having coverage while keeping connectivity. These are two closely related and also very essential prerequisites. They are also very important measurements of Quality of Service (QoS) for wireless sensor networks. Rather than considering sensing coverage and networking connectivity as two separate sub problems, the proposed protocol attempts to integrate them in a single algorithm. Each and every sensor node has a priority assigned to it, in the proposed distributed algorithm. This paper presents the design and analysis of novel algorithm Efficient Energy, Coverage and Connectivity (ECC/ EC2) Algorithm that can dynamically configure a wireless sensor network to result in ensured degrees of coverage and connectivity. This algorithm is simulated using NS2 and compared against integrated CCP with SPAN [5] algorithm and also with Distributed Probabilistic Coverage-preserving Configuration Protocol (DPCCP)[6] with SPAN protocol in the literature and show that it activates lesser number of sensor nodes, consumes much lesser energy and
enhances the network lifetime considerably.

References

- Kuei-Ping Shih, Hung-Chang Chen, and Bo-Jun Liu; Integrating Target Coverage and Connectivity for Wireless Heterogeneous Sensor Networks with Multiple Sensing Units; IEEE, ICON proceedings, 2007, pp. 419-424.
- Network Simulator: www.isi.edu/nsnam/ns
- Mohammad ali Jamali, Navid Bakhshivand, Mohammad Easmaeilpour, Davood Salami; An Energy-Efficient Algorithm for connected target coverage problem in wireless sensor networks; 3rd IEEE International Conference Computer Science & Information Technology (ICCSIT) on 9-11 July 2010, pp-249-254
- Tian Ying, Zhang Shu-Fang and Wang Ying; A Distributed Protocol for Ensuring Both Probabilistic Coverage and Connectivity of High Density Wireless Sensor Networks; IEEE Communications Society, WCNC 2008 proceedings, pp 2061-2074
An Efficient Energy, Coverage And Connectivity (EC2) Algorithm for Wireless Sensor Networks

- Shibo He, Jiming Chen and Youxian Sun; Coverage and Connectivity in Duty-Cycled Wireless Sensor Networks for Event Monitoring; Parallel and Distributed Systems, IEEE Transactions March 2012, V. 23 Issue: 3 pp. 475 – 482.

Index Terms

Computer Science  Wireless Communications

Keywords

Coverage  Connectivity  energy Conservation  Power Nodes  Power Control