Abstract

Wireless sensor network consists of large number of tiny sensor nodes which are usually deployed in a harsh environment. Self configuration and infrastructure less are the two fundamental properties of sensor networks. Sensor nodes are highly energy constrained devices because they are battery operated devices and due to harsh environment deployment it is impossible to change or recharge their battery. Energy conservation and prolonging the network life are two major challenges in a sensor network. Communication consumes the large portion of WSN energy. Several protocols have been proposed to realize power-efficient communication in a wireless sensor network. Cluster based routing protocols are best known for increasing energy efficiency, stability and network lifetime of WSNs. Low Energy Adaptive Clustering Hierarchy (LEACH) is an important protocol in this class. One of the disadvantages
DE-LEACH: Distance and Energy Aware LEACH

of LEACH is that it does not consider the nodes energy and distance for the election of cluster head. This paper proposes a new energy efficient clustering protocol DE-LEACH for homogeneous wireless sensor network which is an extension of LEACH. DE-LEACH elects cluster head on the basis of distance and residual energy of the nodes. Proposed protocol increases the network life, stability and throughput of sensor network and simulations result shows that DE-LEACH is better than LEACH.

References

- I. F. Akyildiz, W. Su, Y. Sankarasubramaniam, and E. Cayirci, "Wireless sensor networks: a survey," Computer Networks, 38(4) pp. 393–422, March 2002
- K. Sohrabi and J. Pottie, "Protocols for self-organization of a wireless sensor network," IEEE Personal Commun. 7(5), 2000, pp 16-27
- Kemal Akkaya and Mohamed Younis, "A Survey on Routing Protocols for Wireless Sensor Networks," Ad Hoc Networks, Vol. 3, No. 3, pp 325-349, May 2005
- J. Al-Karaki, and A. Kamal, "Routing Techniques in Wireless Sensor Networks: A Survey," IEEE Communications Magazine, vol 11, no. 6, Dec. 2004, pp. 6-28.
- W. Heinzelman, A. Chandrakasan, and H. Balakrishnan, "An application specific protocol architecture for wireless microsensor networks," IEEE Transactions on Wireless Communications, vol. 1, no. 4, pp. 660 – 670, Oct. 2002
- Liang, Chiu-Kuo, Yu-Jie Huang, and Jian-Da Lin, "An energy efficient routing scheme in wireless sensor networks," In Advanced Information Networking and Applications-Workshops, 2008. AINAW 2008. 22nd International Conference on, pp. 916-921. IEEE, 2008.
- Jun Zheng and Abbas Jamalipour, "Wireless Sensor Networks: A Networking Perspective," a book published by A John & Sons, Inc, and IEEE, 2009.
- S. Lindsey and C. Raghavendra, "PEGASIS: Power-Efficient Gathering in Sensor Information Systems," IEEE Aerospace Conf. Proc., 2002, vol. 3, 9–16, pp. 1125–30.
- Younis, Ossama, and Sonia Fahmy. "HEED: a hybrid, energy-efficient, distributed clustering approach for ad hoc sensor networks." Mobile Computing, IEEE Transactions on 3, no. 4 (2004), pp. 366-379
- A. Manjeshwar and D. P. Agrawal, "TEEN: A routing protocol for enhanced efficiency in wireless sensor networks," Proceedings IPDPS &apos;01, San Francisco, CA, Apr. 2001 , pp. 2009 – 2015
- A. Manjeshwar and D. P. Agrawal, "APTEEN: A hybrid protocol for efficient routing and comprehensive information retrieval in wireless sensor networks," Proceedings IPDPS&apos;01, San Francisco, CA, Apr. 2001 , pp. 2009 – 2015
- S. Bandyopadhyay and E. Coyle, "An energy efficient hierarchical clustering algorithm for wireless sensor networks," in Proceeding of INFOCOM 2003 , vol. 3, San Francisco, CA, Apr. 2003, pp. 1713 – 1723
- G. Smaragdakis, I. Matta, A. Bestavros, "SEP: A Stable Election Protocol For Clustered Heterogeneous Wireless Sensor Networks," in proceedings of 2nd International Workshop on Sensor and Actor Network Protocols and Applications (SANPA&apos;04), Boston, MA, 2004, pp. 660-670
- Qing, Li, Qingxin Zhu, and Mingwen Wang. "Design of a distributed energy-efficient clustering algorithm for heterogeneous wireless sensor networks." ELSEVIER Computer communications 29, no. 12, 2006, pp. 2230-2237.
- S. Kumar, M. Prateek, B. Bhushan. "Distance based cluster protocol for heterogeneous wireless sensor network," IJCA, Vol 76, No 9, pp. 42-47, August 2013

Index Terms

Computer Science
Wireless

Keywords

Cluster  Energy Efficiency  Initial Energy  Residual Energy  Wireless Sensor Network