

Acknowledgments

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References

- [1] I. F. Akyildiz, W. Su and Y. Sankarasubramaniam, "Wireless Sensor Networks: a Survey," *Computer Networks*, vol. 38, no. 4, 2002, pp. 393-422.
- [2] M. A. Yigitel, O. D. Incel and C. Ersoy, "QoS-aware MAC protocols for wireless sensor networks: A survey", *Computer Networks*, vol.55, no.4, 2011, pp.1982–2004.
- [3] Bhattacharya D, Krishnamoorthy R. "Power Optimization in Wireless Sensor Networks", *International Journal of Computer Science Issues*, 2011, vol.8, no.5.
- R. T. Matani and T. M. Vasavada, "A Survey on MAC Protocols for Data Collection in Wireless Sensor Networks," *International Journal of Computer Applications*, vol. 114, no. 6, 2015, pp. 4-7.
- [4] N. Saxena, A. Roy and J. Shin, "Dynamic duty cycle and adaptive contention window based QoS-MAC protocol for wireless multimedia sensor networks," *Computer Networks*, vol. 52, no. 13, 2008, pp. 2532–2542.
- [5] J. He, G.W. Bai and L. Cao, "DQ-MAC: A Diffserv-based MAC Mechanism in Wireless Sensor Networks," *Computer Science*, vol. 37, no. 12, 2010, pp.30-34.
- [6] P. Suriyachai, U. Roedig and A. Scott, "Implementation Of A Mac Protocol For QoS Support In Wireless Sensor Networks," in *Proceedings of 7th Annual IEEE International Conference on Pervasive Computing and Communications*, Galveston, 2009, pp. 1-6.
- [7] L. Zhang, L. Da-Shuang, J. B. Mao and Z.Y. Jing, "A TDMA MAC Protocol Supporting QoS in Ad Hoc Network," *Communications Technology*, vol. 47, no. 10, 2014, pp.1162-1166.
- [8] I. Slama, B. Shrestha and B. Jouaber, "A hybrid MAC with prioritization for wireless sensor networks," in *Proceedings of 33rd IEEE Conference on Local Computer Networks (LCN)*, Montreal, 2008, pp. 274-281.
- [9] J. Liu, Z. Wang, Y. Huo and Y. Wang, "A Hybrid MAC Protocol with QoS Guarantee in Ad hoc Network," in *Proceedings of International Conference on Computer Science and Information Technology*, Springer India, 2014, pp. 269-277.
- [10] W. Ye, J. Heidemann and D. Estrin, "An energy-efficient MAC protocol for wireless sensor networks," in *Proceedings of IEEE INFOCOM 2002*, New York, 2002, pp. 1567-1576.
- [11] W. Ye, J. Heidemann and D. Estrin, "Medium Access Control With Coordinated Adaptive Sleeping for Wireless Sensor Networks," *IEEE/ACM Transactions on Networking*, vol. 12, no. 3, 2004, pp. 493-506.
- [12] A. K. Jacob and L. Jacob, "Energy Efficient MAC for QoS Traffic in Wireless Body Area Network," *International Journal of Distributed Sensor Networks*, vol. 2015, 2015, pp. 1-12.
- [13] Z. Hamid and F. B. Hussain, "QoS in Wireless Multimedia Sensor Networks: A Layered and Cross-Layered Approach," *Wireless Personal Communications An International Journal*, vol. 75, no. 1, 2014, pp. 729-757.
- [14] B. Cheng, L. Ci and C. Tian, "Contention Window-Based MAC Protocol for Wireless Sensor Networks," in *Proceedings of 12th IEEE International Conference on Dependable, Autonomic and Secure Computing*, Dalian, 2014, pp. 479–484.
- [15] X. Fafoutis, C. Orfanidis and D. Nicola, "Altruistic Backoff: Collision Avoidance for Receiver-Initiated MAC Protocols for Wireless Sensor Networks," *International Journal of Distributed Sensor Networks*, vol. 37, no. 1, 2014, pp. 4-4.
- [16] C. Min and Y. I. Eom, "Integrating Lock-Free and Combining Techniques for a Practical and Scalable FIFO Queue," *Parallel and Distributed Systems*, *IEEE Transactions on*, vol. 26, no. 7, 2015, pp. 1910-1922.

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