

Acknowledgments

This work is supported by the National Key Technology R&D Program of China (2015BAF32B04-3), the Joint Funds of the National Natural Science Foundation of China (Grant no. U1404615), the Key Science and Research Program in University of Henan Province (16A460018), the Project of Basic and Advanced Technology Research of Henan Province of China (152300410081), the Program for Innovative Research Team (in Science and Technology) in University of Henan Province (15IRTSTHN008), Open Funds of State Key Laboratory of Millimeter Waves (Grant no. K201504), and China Post doctoral Science Foundation (Grant no. 2015M571637).

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.

Guoqiang Zheng Received the Ph.D. degree in Communication and information systems professional from Xi'an Jiaotong University, China, 2008. He is a professor at Henan University of Science and Technology on College of Electronic Information Engineering, China. His research interests include wireless communication technology, network communication protocol and software radio theory.

Yaru Sun Received the B.S. degree in Henan University of Science and Technology, Luoyang, China in 2014. She is currently working towards M.S. degree in Henan University of Science and Technology, Luoyang, China. Her research interests include WSNs and MAC Protocol.

Bingwu Kang Received the B.S. degree in Luoyang Normal University, Luoyang, China in 2013. And received the M.S. degree in Henan University of Science and Technology, Luoyang, China in 2016.

Huahong Ma Received her master degree in Signal and Information Processing in July 2005 at Yunnan University, China. Now, she is a Ph.D. candidate in Control Science and Engineering at Henan University of Science and Technology. Her main research interests are Crowd Sensing Network and Internet of Things.

Jishun Li Received the Ph.D. degree in Mechanical Manufacture and Automation from Shanghai Jiaotong University, China, 1996. He is a professor at Henan University of Science and Technology on College of Mechatronics Engineering, China.

Yuting Wang Received the B.S. degree in Henan University of Science and Technology, Luoyang, China in 2015. She is currently working towards M.S. degree in Henan University of Science and Technology, Luoyang, China.