Since previous researches just focused on finding optimal *CW* value without consideration on how to synchronize the value with stations, each station should try to find the value based on its own network view, which results in network performance degradation. Furthermore, the performance degradation becomes severe according to the increasing number of newly joined stations due to the movement and turning on events. Therefore, this paper proposes a simple *CW* synchronization scheme by means of beacon and probe response messages. In addition, performance evaluation results show that the proposed scheme can have higher network throughput and reduced adaptation time compared with previous researches. In our future work, the experiments with smart phones and AP will be conducted considering real environments.

ACKNOWLEDGMENT

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea Government (MSIT) (No.2020R1G1A1100493).

REFERENCES

[1] Q. Qu, B. Li, M. Yang, Z. Yan, A. Yang, D. Deng, and K. Chen, "Survey and Performance Evaluation of the Upcoming Next Generation WLANs Standard-IEEE 802.11ax," Mobile Networks and Applications, vol. 24, pp. 1461-1474, 2019.

[2] Cisco, "Cisco visual networking index: global mobile data traffic forecast update, 2016-2021" Cisco Technical Report, Cisco, Jialefuniya, America.

[3] J. Sheth and B. Dezfouli, "Enhancing the Energy-Efficiency and Timeliness of IoT Communication in WiFi Networks," IEEE Internet of Things Journal, vol. 6, no. 5, pp. 9085-9097, Oct. 2019.

[4] J. Yang, H. Zou, H. Jiang, and L. Xie, "Device-Free Occupant Activity Sensing Using WiFi-Enabled IoT Devices for Smart Homes," IEEE Internet of Things Journal, vol. 5, no. 5, pp. 3991-4002, Oct. 2018.

[5] S. R. Pokhrel, H. L. Vu, and A. L. Cricenti, "Adaptive Admission Control for IoT Applications in Home WiFi Networks," IEEE Transactions on Mobile Computing, vol. 19, no. 12, pp. 2731-2742, Aug. 2019.

[6] IEEE Standard for Information technology—Telecommunications and information exchange between systems Local and metropolitan area networks—Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, 2016.

[7] I. Syed and B. Roh, "Adaptive backoff algorithm for contention window for dense IEEE 802.11 WLANs," Mobile Information Systems, vol. 2016, pp. 1-11, 2016.

[8] F. Li, G. Huang, Q. Yang, and M. Xie, "Adaptive Contention Window MAC Protocol in a Global View for Emerging Trends Networks," IEEE ACCESS, vol. 9, pp. 18402-18423, Jan. 2021.

[9] I. Syed, S. Shin, B. Roh, and M. Adnan, "Performance Improvement of QoS-Enabled WLANs Using Adaptive Contention Window Backoff Algorithm," IEEE Systems Journal, vol. 12, no. 4, pp. 3260-3270, 2018.

[10] R. Ali, N. Shahin, Y.T. Kim, B.S. Kim, and S.W. Kim, "Channel observaton-based scaled backoff mechanism for high-efficiency WLANs," Electronics Letter, vol. 54, no. 10, pp. 663-665, 2018.

[11] N. Shahin, R. Ali, S. Kim, and Y. Kim, "Cognitive Backoff Mechanism for IEEE802.11ax High-Efficiency WLANs," Journal of Communications and Networks, vol. 21, no. 2, pp. 158-167, 2019.

[12] Y. Cheng, H. Zhou, and D. Yang, ''CA-CWA: Channel-aware contention window adaption in IEEE 802.11ah for soft real-time industrial applications,'' Sensors, vol. 19, no. 13, p. 3002, Jul. 2019.

[13] Y. Rao, C. Deng, G. Zhao, Y. Qiao, L.-Y. Fu, X. Shao, and R.-C. Wang, ''Self-adaptive implicit contention window adjustment mechanism for QoS optimization in wireless sensor networks,'' Journal of Network and Computer Applications, vol. 109, pp. 36–52, May 2018.

[14] M. Heusse, F. Rousseau, R. Guillier, and A. Duda, "Idle sense: an optimal access method for high throughput and fairness in rate diverse wireless LANs," in Proc. ACM SIGCOMM, pp. 121–132, 2005.

[15] S. Chun, D. Xianhua, L. Pingyuan, and Z. Han, "Adaptive Access Mechanism with Optimal Contention Window Based on Node Number Estimation Using Multiple Thresholds," IEEE Transactions on Wireless Communications, vol. 11, pp. 2046-2055, 2012.

[16] E. Khorov, A. Kiryanov, A. Lyakhov, and G. Bianchi, "A Tutorial on IEEE 802.11ax High Efficiency WLANs," IEEE Communications Surveys & Tutorials, vol. 21, no. 1, pp. 197-216, First Quarter 2019.

[17] M. Peng, G. He, L. Wang, and C. Kai, "AP Selection Scheme Based on Achievable Throughput in SDN-Enabled WLANs," IEEE ACCESS, vol. 7, pp. 4763-4772, Dec. 2018.

[18] K. Kostal, R. Bencel, M. Ries, P. Truchly, and I. Kotuliak, "High Performance SDN WLAN Architecture," Sensors, vol. 19, April 2019.

[19] B. Tan, Q. Chen, K. Chetty, K. Woodbridge, W. Li, and R. Piechocki, "Exploiting WiFi Channel State Information for Residential Healthcare Informatics," IEEE Communications Magazine, vol. 56, no. 5, pp. 130-137, May 2018.

[20] G. Bianchi, "Performance Analysis of the IEEE 802.11 Distributed Coordination Function," IEEE Journal on Selected Areas in Communications," vol. 18, no. 3, pp. 535-547, March 2000.