response. Both algorithms have significant differences in response time results but have similar results in positions of energy depletion, with the results of the proposed prototype achieving the lowest value in both. Their main reason is the central system that all sources can use better and more consciously.

IV. Conclusion

This paper presented a novel energy efficiency and service delay minimization model. It is portrayed how our delay-minimizing and energy model can be advantageously improved on the computation for IoT resource pooling and data transfers to the cloud; proper energy efficiency increases networking computation. Numerous numerical results are provided to back this claim by showing how variations in constraints could affect the reduced service delay shows a 7% decrease of the total 18.2% renewable contribution. In forthcoming activities, we subjected this model to reinforcement learning to mainly a) reduce greenhouse gas emissions, b) automatically recognize the environment to determine which percentage of energy is needed to accomplish a task at hand, c) regulate energy consumption based on the dynamics of technology, and d) peak reduction.

Acknowledgment

We are grateful to the anonymous reviewers for reviewing this paper.

Reference

[1] W. Shafik, M. Matinkhah, P. Etemadinejad, M. N. Sanda, "Reinforcement learning rebirth, techniques, challenges, and resolutions," JOIV: International Journal on Informatics Visualization," vol. 4, no. 3, pp. 127-135, 2020.

[2] W. Shafik, S. M. Matinkhah, M. N. Sanda and S. S. Afolabi, "A 3-dimensional fast machine learning algorithm for mobile unmanned aerial vehicle base stations," International Journal of Advances in Applied Sciences, vol. 10, no. 1, pp. 28–38, 2020.

[3] W. Shafik, S. M. Matinkhah and M. N. Sanda, "Network resource management drives machine learning: a survey and future research direction," Journal of Communications Technology, Electronics and Computer Science, vol. 30, pp. 1–15, 2020.

[4] W. Shafik, S. M. Matinkhah and M. Ghasemazade, "Fog-mobile edge performance evaluation and analysis on internet of things," Journal of Advance Research in Mobile Computing, vol. 1, no. 3, pp. 1–17, 2019.

[5] W. Shafik, S. M. Matinkhah and M. Ghasemzadeh, "A fast machine learning for 5g beam selection for unmanned aerial vehicle applications," Information Systems & Telecommunication, vol. 7, no. 28, pp. 262-278, 2019.

[6] H. Meng, W. Shafik, S. M. Matinkhah and Z. Ahmad, "A 5g beam selection machine learning algorithm for unmanned aerial vehicle applications," Wireless Communications and Mobile Computing, 2020.

[7] W. Shafik and S. A. Mostafavi, "Knowledge engineering on internet of things through reinforcement learning," International Journal of Computer Applications, vol.177, no. 44, pp. 0975–8887, 2019.

[8] W. Shafik, S. M. Matinkhah, M. Asadi, Z. Ahmadi and Z. Hadiyan, "A study on internet of things performance evaluation," Journal of Communications Technology, Electronics and Computer Science, vol. 28, pp. 1–19, 2020.

[9] W. Shafik, S. M. Matinkhah and M. Ghasemzadeh, "Theoretical understanding of deep learning in uav biomedical engineering technologies analysis," SN Computer Science, vol. 1, no. 6, pp. 1–13, 2020.

[10] S. Mostafavi and W. Shafik, "Fog computing architectures, privacy and security solutions," Journal of Communications Technology, Electronics and Computer Science, vol. 24, pp. 1–14, 2019.

[11] S. Sanakkayala, S.C. Joseph, A. Venkatesha, R. Polimera, R. S. Pawar et al, "Heart-beat monitoring of virtual machines for initiating failover operations in a data storage management system, using ping monitoring of target virtual machines," Google Patents 15/716,386, 2018.

[12] O. Akrivopoulos, I. Chatzigiannakis, C. Tselios, A. Antoniou, "On the deployment of healthcare applications over fog computing infrastructure," IEEE 41st Annual Computer Software and Applications Conference (COMPSAC), vol. 2, pp. 288-293, 2017.

[13] M. Chiang and T. Zhang, "Fog and IoT: An overview of research opportunities," IEEE Internet of things journal, vol. 3, no. 6, pp. 854-64, 2016.

[14] F. E. Samann, S. R. Zeebaree and S. Askar, "IoT provisioning QoS based on cloud and fog computing," *Journal of Applied Science and Technology Trends.* vol. 2, no. 01, pp. 29-40, 2021.

[15] Y. Wu, H. N. Dai, H. Wang and K. K. Choo, "Blockchain-based privacy preservation for 5g-enabled drone communications," IEEE Network. vol. 35, no.1, pp. 50-66, 2021.

[16] Y. S. Patel, M. K. Mishra, B. S. Mishra, R. Misra, "Cloud of things assimilation with cyber physical system: a review," *Internet of Things: Enabling Technologies, Security and Social Implications,* pp. 93-110, 2021.

[17] E. E. Abel and A. L. Muhammad, "Management of WSN-enabled cloud internet of things: a review," *International Journal of Computing and Digital Systems.* vol. 10, pp. 353-372, 2021.

[18] E. B. Hansen and S. Bøgh, "Artificial intelligence and internet of things in small and medium-sized enterprises: A survey," *Journal of Manufacturing Systems*, vol. 58, pp. 362-372, 2021.

[19] A. Hajebrahimi, I. Kamwa, E. Delage, and M. Abdelaziz, "Adaptive distributionally robust optimization for electricity and electrified transportation planning," IEEE Trans. Smart Grid, 2020.

[20] A. J. Wilson, D. R. Reising, R. W. Hay, R. C. Johnson, A. A. Karrar et al., "Automated identification of electrical disturbance waveforms within an operational smart power grid," *IEEE Trans. Smart Grid*, 2020.

[21] A. B. Rjab and S. Mellouli, "Smart cities in the era of artificial intelligence and internet of things: promises and challenges," *Smart Cities and Smart Governance: Towards the 22nd Century Sustainable City*, pp. 259-88, 2021.

[22] T. Qayyum, Z. Trabelsi, A. W. Malik, K. Hayawi, "Multi-level resource sharing framework using collaborative fog environment for smart cities," *IEEE Access*, vol. 9, pp. 21859-21869, 2021.

[23] M. Kaur, R. Aron, "A systematic study of load balancing approaches in the fog computing environment," *The Journal of Supercomputing,* vol. 4, pp. 1-46, 2021.

[24] A. Suyyagh, J. G. Tong, and Z. Zilic, "Performance evaluation of meta-heuristics in energy-aware real-time scheduling problems," *Jordanian Journal of Computers and Information Technology (JJCIT)*, vol. 2, no. 1, pp. 168-185, 2016.

[25] H. G. Abreha, C. J. Bernardos, A. D. Oliva, L. Cominardi and A. Azcorra, "Monitoring in fog computing: state-of-the-art and research challenges," *International Journal of Ad Hoc and Ubiquitous Computing*, vol. 36, no. 2, pp. 114-130, 2021.

[26] M. Keshavarznejad, M. H. Rezvani, S. Adabi, "Delay-aware optimization of energy consumption for task offloading in fog environments using metaheuristic algorithms," *Cluster Computing,* pp. 1-29, 2021.

[27] T. Nguyen Gia et al., "Energy-efficient fog-assisted IoT system for monitoring diabetic patients with cardiovascular disease," Future Generation Computer Systems (FGCS), vol. 93, pp. 198–211, Apr. 2019.

[28] X. Chen, Y. Zhou, B. He and L. Lv, "Energy-efficiency fog computing resource allocation in cyber physical internet of things systems," IET Commun., vol. 13, no. 13, pp. 2003–2011, May 2019.

[29] M. Abbasi, E. Mohammadi-Pasand, M. R. Khosravi, "Intelligent workload allocation in IoT–Fog–cloud architecture towards mobile edge computing," Computer Communications, vo.169, pp. 71-80, 2021.

[30] W. Shafik and S. M. Matinkhah, "Admitting New Requests in Fog Networks According to Erlang B Distribution," in 2019 27th Iranian Conference on Electrical Engineering (ICEE), Yazd, Iran, pp. 2016–2021, 2019.

[31] W. Shafik, "A fast machine learning for beam selection in 5g unmanned aerial vehicle communications" M.Sc. dissertation, Yazd University, Iran, 2020.