Hindawi
Wireless Communications and Mobile Computing
Volume 2022, Article ID 9756304, 2 pages
https://doi.org/10.1155/2022/9756304

Editorial

Edge Caching and Computing for Wireless Networks

Lisheng Fan,[1] **Junhui Zhao**,[2,3] **George K. Karagiannidis**,[4] **and Rose Qingyang Hu**[5]

[1]*School of Computer Science, Guangzhou University, Guangzhou, China*
[2]*School of Electronic and Information Engineering, Beijing Jiaotong University, Beijing 100044, China*
[3]*School of Information Engineering, East China Jiaotong University, Nanchang 330013, China*
[4]*Aristotle University of Thessaloniki, Thessaloniki 54636, Greece*
[5]*Department of Electrical and Computer Engineering, Utah State University, Logan, UT 84321, USA*

Correspondence should be addressed to Lisheng Fan; lsfan@gzhu.edu.cn

Received 8 March 2022; Accepted 8 March 2022; Published 21 April 2022

In the next-generation wireless networks, there have been explosively increasing wireless data services, such as video streaming, push media, mobile application download/updates, and mobile TV. These new services involve both intensive communication and computation, and to meet these requirements, edge caching and computing have been recently proposed.

Caching brings content closer to users by prefetching the content during off-peak times and hence can greatly reduce network congestion and improve the user-perceived experience. Moreover, edge computing can help alleviate the computation load on the central node, by offloading the computation tasks into edge nodes through wireless transmission links. In this special issue, we have invited a few papers to give insights on wireless caching and computing for wireless networks.

One paper of this special issue in Ref. [1] investigated range-angle localization of targets via double-pulse FDA-MIMO radar, where an accurate sparse recovery algorithm was proposed to enhance the performance of localization. In particular, the localization error was reduced significantly, and the system accuracy was enhanced obviously. Moreover, another paper of this special issue in Ref. [2] studied multinode collaborative computing offloading algorithm based on minimization of energy consumption, where the system performance in terms of energy consumption was minimized, which can help prolong the service time of the nodes in the wireless networks. In further, another paper of this issue in Ref. [3] studied the impact of imperfect channel estimation for cache-enabled UAV relaying networks, where the system diversity order caused by caching and multiple UAVs vanished due to the presence of channel estimation error.

In addition to the above works, there are some rest papers in this special issue on the application of artificial intelligence on the wireless caching and computing networks, as shown in Refs. [4–6]. In particular, deep reinforcement learning was proposed in these works, in order to provide an intelligent solution to the system resource allocation, such as caching allocation and offloading allocation, bandwidth allocation, and power allocation. Some other recent works on the intelligent algorithms, such as deep reinforcement learning [11, 13], deep learning [9, 12], federated learning [7, 8], and cache-enabled learning [10], can be viewed as an important extension to these works, which could help enhance the system performance of caching and computing networks furthermore.

Conflicts of Interest

The editors declare that they have no conflicts of interest regarding the publication of this Special Issue.

Lisheng Fan
Junhui Zhao
George K. Karagiannidis
Rose Qingyang Hu

References

[1] Q. Liu, X. Wang, L. Wan, M. Huang, and L. Sun, "An accurate sparse recovery algorithm for range-angle localization of targets via double-pulse FDA-MIMO radar," *Wireless Communications and Mobile Computing*, vol. 2020, Article ID 6698446, 12 pages, 2020.

[2] D. Han, Y. Liu, and J. Ni, "Research on multinode collaborative computing offloading algorithm based on minimization of energy consumption," *Wireless Communications and Mobile Computing*, vol. 2020, Article ID 8858298, 11 pages, 2020.

[3] D. Deng, Y. Rao, and F. Zhu, "Impact of hardware impairments with imperfect channel estimation for cache- enabled UAV relaying networks," *Wireless Communications and Mobile Computing*, vol. 2020, Article ID 8891793, 12 pages, 2020.

[4] Z. Wan and Y. Li, "Deep reinforcement learning-based collaborative video caching and transcoding in clustered and intelligent edge B5G networks," *Wireless Communications and Mobile Computing*, vol. 2020, 16 pages, 2020.

[5] L. Li, C. F. Kwong, Q. Liu, and J. Wang, "A smart cache content update policy based on deep reinforcement learning," *Wireless Communications and Mobile Computing*, vol. 2020, Article ID 8836592, 11 pages, 2020.

[6] Z. Wang, T. Li, J. Ye, X. Yang, and K. Xiong, "AN-aided secure beamforming in SWIPT-aware mobile edge computing systems with cognitive radio," *Wireless Communications and Mobile Computing*, vol. 2020, Article ID 8899314, 10 pages, 2020.

[7] S. Tang and L. Chen, "Computational intelligence and deep learning for next generation edge-enabled industrial IoT," *IEEE Transactions Network Science and Engineering*, vol. 8, no. 1, pp. 114–125, 2021.

[8] L. He, K. He, L. Fan, Y. Deng, G. K. Karagiannidis, and A. Nallanathan, "Learning-based signal detection for MIMO systems with unknown noise statistics," *IEEE Transactions on Communications*, vol. 69, no. 5, pp. 3025–3038, 2021.

[9] L. Chen and F. Zhou, "Physical-layer security on mobile edge computing for emerging cyber physical systems," *Computer Communications*, vol. 178, no. 1, pp. 297–306, 2021.

[10] W. Zhou, L. Chen, S. Tang et al., "PSO based offloading strategy with PSO for mobile edge computing based on cache mechanism," *Cluster Computing*, 2021.

[11] L. Chen, R. Zhao, and Z. Zhao, "Intelligent ubiquitous computing for future UAV-enabled MEC network systems," *Cluster Computing*, 2021.

[12] S. Tang and L. Lai, "Battery-constrained federated edge learning in UAV enabled IoT for B5G/6G networks," *Physical Communication*, vol. 47, p. 101381, 2021.

[13] K. He and Y. Deng, "Efficient memory-bounded optimal detection for GSM MIMO systems," *IEEE Transactions on Communications*, vol. 70, no. 2, pp. 105–121, 2022.