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Editorial: Special Topic on Edge Intelligence for Internet of Things

Guest Editor

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With the fast development of the Internet of Things (IoT), increasing numbers of devices are connected to the IoT network and generate massive amounts of data. The traditional centralized cloud computing architecture cannot meet the requirements of both latency and data security. Within this context, edge computing and edge intelligence can shift data processing, computing applications and services from centralized cloud servers to the edge of a network. Depending on the processing requirements, the data generated by an edge device is either processed at the device itself or the local node deployed at the periphery of the network. This enables the analysis to be performed near the data source to avoid the delay caused by moving data to the cloud. It also allows sensitive data to be processed locally, and only non-sensitive data will be transmitted to the data center for centralized processing. On the other hand, the application of edge intelligence still faces many challenges, such as inconsistent IoT technical standards, serious energy consumption and pollution, heterogeneous IoT network and data, and data security and privacy protection.

To overcome these challenges, the first paper "RecCac: Recommendation-Empowered Cooperative Edge Caching for Internet of Things" by LI Xiuhua et al. focuses on the joint problem of cooperative edge caching and recommender systems to achieve additional cache gains and increase "effective" cache size. This paper supports massive content access in mobile edge networks and addresses rapidly growing IoT services and content applications.

The second paper is dedicated to reducing the cost of cross-edge analysis. "Cost-Effective Task Scheduling for Collaborative Cross-Edge Analytics" by ZHAO Kongyang et al. empirically demonstrates that reducing either analytics response time or network traffic volume cannot necessarily minimize the wide area network (WAN) traffic cost, due to price heterogeneity of WAN links, so they propose to schedule analytic tasks based on both price and bandwidth heterogeneities.

The remaining three papers mainly study the application of edge intelligence. "BPPF: Bilateral Privacy-Preserving Framework for Mobile Crowdsensing" by LIU Junyu et al. studies privacy protection in Mobile Crowdsensing (MCS) and proposes a bilateral privacy protection framework (BPPF) based on matrix multiplication for protecting the location privacy between the task and the worker, and keep their relative distance unchanged. "Maximum-Profit Advertising Strategy Using Crowdsensing Trajectory Data" by LOU Kaihao et al. also works with MCS and proposes some effective advertising strategies to help maximize commercial profit for the advertiser by attracting potential customers using out-door billboard advertising. "Speed Estimation Using Commercial Wi-Fi Device in Smart Home" by TIAN Zengshan et al. studies Wi-Fi-based approaches to measure the speed of the moving target and proposes a direction independent indoor speed estimation system in terms of electromagnetic wave statistical theory.

Finally, we would like to thank all the authors for contributing their papers to this special issue and the external reviewers for volunteering their time to review the submissions.

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