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Introduction



Nei Kato

I assumed this office 1 July, 2015, and it is an honor to work with all of you to lead *IEEE Network* forward. I would like to thank my predecessor, Prof. Sherman Shen, for his valuable advice during the transition from one Editor-in-Chief to another, and Director of Magazine, Steve Gorshe, for his continuous support from a broader point of view. With their help and the cooperation of our Editors as well as the ComSoc staff, I am going to try my best to maintain the momentum or even push it to a higher level. I am taking the liberty of sharing with you some of my thoughts on the important direction of our magazine so that you may get a flavor of where the magazine is heading.

First, let me point out that we are in an era of fusion of technologies. For example, wired networks, wireless networks, and optical networks traditionally tended to be studied separately, but now the tendency is toward an interdisciplinary approach. Research on the fifth generation (5G) is no exception. On top of individual breakthroughs in technologies, readers also give high value to articles capturing integration of various technologies. The following topics are of paramount importance and can be approached in such a manner.

The first topic that comes to mind is network architecture to guarantee users unfettered access to networks. New design contributions on network architecture, including wired, wireless, mobile, cellular, sensor, optical, and other related network technologies, as well as the integration of various networking paradigms, particularly from the 5G vision, including robust networks, disaster/attack-resilient networks, massive and 3D MIMO, software defined networks (SDNs), network functions virtualization (NFV), and so forth, can be relevant themes under this topic. The second topic I would like to consider is the advanced research on wireless mobile networks including mobile computing and networking, cognitive radio, vehicular networks, UAV-aided communication, energy awareness, efficient frequency use, mobile applications and services, wireless sensing systems (e.g., wearable computing, body area networks, under-water networks), and so on. Since all visions on these future wireless networks hinge on a multi-access network environment, the next topic that naturally follows is the specific aspects related to next-generation heterogeneous access networks such as smart radio access networking, efficient backhauling, and traffic offloading.

The next topic deals with the Internet of Things (IoT) ecosystem and its promising application developments and case studies involving big data transfer, machine-to-machine (M2M), and device-to-device (D2D) communications. Cloud computing is also a topic of significant impact that I would like to consider in terms of high-performance mobile clouds, cloud resource virtualization, cloud provisioning orchestration, innovative cloud services (like media cloud gaming and e-health cloud applications), and so forth. The common aspect of all these networking topics is that there is a critical need for new ways to reduce energy consumption to reduce the carbon footprint, and I recognize that green communications and networking constitute a very important topic encompassing themes

like energy-efficient networking and protocols, energy efficiency in data centers and content delivery networks, smart sensing, and energy harvesting. To promote the vision of a greener society even further, I would also identify smart grid communication networks as an important topic, covering micro grids, renewable energy generation and storage, advanced metering infrastructure and demand-response management over 5G technologies, and so forth.

Recent exploration of this wide variety of networking technologies has motivated a new wave of interest in quality of service (QoS), which I feel is worth taking into account along with its related metrics like quality of experience (QoE), quality of protection (QoP), survivability, availability, reliability, resource provisioning and management, and system performance guarantees. All advancement in networking technologies comes at a price, however, as it brings new security concerns, and it is undoubtedly important to consider a variety of advanced and current topics related to security and privacy such as authentication and access control, cryptographic protection, intrusion

detection and prevention, and digital forensics. In addition, social networking is flourishing like never before, and it is important to also take a closer look at this topic, particularly regarding anonymity, safety, and privacy issues arising from location-based services and experience mining that are essential to protect ourselves both online and offline.

Traditional topics such as ad hoc and mesh and sensor networks, vehicular networks, Wi-Fi networks, and satellite networks are also welcome, especially from new perspectives. For instance, Wi-Fi networks provide QoS and energy saving functions; satellite networks provide integrated functions with terrestrial wireless networks; and ad hoc and mesh and sensor networks provide practical use cases.

The above-mentioned opinions are just some personal thoughts in terms of what is important for this magazine. I would be more than happy to hear your voice regarding how we should pick up or categorize important/new topics so as to be more attractive to readers in both academia and industry. Please contact me at kato@it.ecei.tohoku.ac.jp.