MESSAGE FROM THE EDITOR-IN-CHIEF

MAINTAINING A ZERO OPEN CALL BACKLOG

HSIAO-HWA CHEN

Dear readers,

February 2015 is the month in which the Lunar New Year will start on February 19 in the traditional Chinese calendar. The year 2015 will be the year of the Goat according to the Chinese zodiac. The Goat (which spells "yáng" in Chinese pinyin) is the eighth sign of the 12-year cycle of animals that appear in the Chinese zodiac related to the Chinese calendar. I would like to take this opportunity to send my best wishes to all of you (of course, also including those who were born in past years of the Goat) for doing well in your career and, most importantly, staying healthy throughout the year 2015.

As a tradition, this issue is published with two sections, one being the Feature Topic (FT), "Mobile Wearable Communications," co-edited by Hassnaa Moustafa, Holger Kenn, Kamran Sayrafian, William Scanlon, and Yan Zhang. The whole editorial team of this FT has worked very hard in order to select the highest quality papers from a large number of submissions. Only four papers survived the review process. For more information about this FT, please refer to the Guest Editorial included in the issue. Mobile wearable devices without doubt have become very popular recently, as indicated by Google Glass, Apple Watch, and Samsung Gear S, among others. Very soon, they will become an important part of mobile devices in the market, replacing traditional watches, glasses, and so on. Therefore, the publication of the articles included in this FT is timely, and hopefully will become important reference sources for the community who are working in the area.

In addition to the Feature Topic section, the second part of this issue contains 12 Open Call papers. Again, I would like to emphasize that all of these Open Call papers were accepted recently thanks to the zero backlog paper queue of this magazine. This means that we are able to publish all accepted

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Open Call papers in the next immediate issue of this magazine. In this way, the submission-to-publication cycle for this magazine has been significantly shortened. This is one of the most significant advantages for this magazine to attract the submissions of a large number of quality papers. Also, due partly to this factor this magazine has become the top publication with the highest impact factor (6.524) in IEEE Communications Society publication history.

The first article is "Social on the Road: Enabling Secure and Efficient Social Networking on Highways," co-authored by Tom H. Luan *et al.* In this article, the authors propose a vehicular social network, called Social on Road (SOR), to enable social communications and interactions among users on the road during their highway travels. This idea was motivated by the fact that there are only limited connections to Internet contents and services, and the essential goal of SOR is to encourage users on the road to spontaneously contribute as an information producer, assembler, and distributer in order to provide timely and localized infotainment with each other through low-cost vehicle-to-vehicle (V2V) communications. To be more specific, SOR enables individual users to access a personal blog (similar to those on Facebook and Twitter), over which users can create and share personal content information with the public, including pictures and videos. By accessing each other's SOR blogs and commenting on interesting topics, passengers can exchange messages and initiate social interactions.

Small cell architecture will be one of the most salient features in the futuristic 5G wireless due to the need to support ultra-high-speed data communications and the limitation of handset battery power. In addition, future 5G wireless systems should also support ad hoc or heterogeneous access. Therefore, network planning faces big challenges due to ad hoc deployment, unbalanced/varying traffic demands, and limited hardware resources in emerging small cell architectures. The second article is "Graph Theory and Its Applications to Future Network Planning: Software-Defined Online Small Cell Management," contributed by Wei Ni *et al.* In this article, the authors discuss the possible applications of graph theory to address the challenges. A software-defined online network management approach is proposed to capture traffic imbalance and fluctuation of small cells, and optimally plan frequencies, infrastructures, and network structure on a real-time basis.

The third article included in this section is co-authored by Chengchao Liang and F. Richard Yu, and is called "Wireless Virtualization for Next Generation Mobile Cellular Networks." In this article, the authors make a survey on some of the work that has been done on wireless virtualization for cellular networks. They also discuss the motivations and business models of the wireless virtualization methodology. In addition, the authors present a framework that enables wireless virtualization. They list a number of challenges that need to be addressed for the deployment of wireless virtualization in next generation mobile cellular networks.

The following article is "Quality-of-Experience Assessment and Its Application to Video Services in LTE Networks," written by Kan Zheng *et al.* In this work, the authors report on their recent research work on developing a database containing subjective assessment scores and the corresponding quality of service (QoS) parameters of 70 video test sequences encoded with H.264, which are corrupted when transmitted over a wireless 3G LTE network simulator. An assessment approach based on neural networks (NNs) is proposed, the weights of which are determined through training. The resultant pseudo-subjective assessment scores are compared to the true mean opinion score (MOS) results in the database. The accuracy of the NN-based prediction tool was tested with the help of those "outside" the set used for NN weight training. As suggested by the authors, the proposed assessment method has potential applications in quality of experience (QoE)-aware network optimization for LTE network operators.

The next article is "Massive Hybrid Antenna Array for Millimeter-Wave Cellular Communications," contributed by Jian A. Zhang *et al.* In this article, the authors discuss several issues on massive antenna array and the state-of-the-art development for millimeter-wave (mm-Wave) hybrid arrays, such as channel modeling, capacity characterization, and practical hardware design. The authors investigate how the hybrid array architecture and special mm-Wave channel properties can be exploited to design suboptimal and practical massive antenna array schemes. They also compare two main types of hybrid arrays, including interleaved and localized arrays, and conclude that the localized array is a better option in terms of overall performance and hardware feasibility.

The sixth article is "Opportunistic Communications in Interference Alignment Networks with Wireless Power Transfer" by Nan Zhao *et al.* This work discusses the issues of interference alignment (IA) as a promising technique for interference management in wireless networks. It is well known that signal-to-interference-plus-noise ratio (SINR) impairment is one of the key challenging issues in IA due to channel fading. In this article, the authors review some existing research work on opportunistic communications (OC)-based IA wireless networks, and propose a simultaneous wireless information and power transfer scheme based on OC in IA wireless networks. Simulation results are presented to show the performance comparison of these schemes.

It is a well-known fact that cloud computing technologies have the potential to improve road safety and traveling experience in intelligent transportation systems (ITS) via providing flexible solutions needed by various road safety enforcement entities. In order to improve traffic safety and provide computational services to road users, a cloud computing model called VANET-Cloud is proposed in the seventh article, "VANET-Cloud: A Generic Cloud Computing Model for Vehicular Ad Hoc Networks," by Salim Bitam *et al.* Various transportation services provided by VANET-Cloud are reviewed, and the challenges associated with the proposed model that still need to be addressed are highlighted.

The eighth article included in this section is "Control and Data Signaling Decoupled Architecture for Railway Wireless Networks," contributed by Li Yan *et al.* This article presents a control and data signaling decoupled architecture, C/U-plane (control/user-plane) decoupled architecture for railway wireless networks, where the relatively important C-plane of passengers' services is kept on high-quality lower-frequency bands to handle mobility, while the corresponding U-plane is moved to higher-frequency bands to gain broader spectra. In this railway wireless network architecture, the U- and C-planes handovers are also physically decoupled. To achieve seamless and soft U-plane handovers, the authors introduce a handover scheme based on coordinated multipoint (CoMP) transmission and reception and bi-casting. The authors have demonstrated that by decoupling the C/U planes, the network performance is greatly enhanced, leading to a more effective way to provide high-speed communications for railway systems.

Plug-in electric vehicles (PEVs) will become more and more popular due to the concern of environmental pollution caused by massive use of gas-powered vehicles. Coordinated charging is an effective charging scheme for PEVs to improve

the overall system energy utilization and prevent overload in electric power grids. In addition, PEVs can be discharged to help the grid to smooth power fluctuations. In this article, "Spatial and Temporal Online Charging/Discharging Coordination for Mobile PEVs," contributed by Miao Wang *et al.*, the authors introduce an online PEV charging/discharging strategy considering range anxieties. To collect real-time information for the proposed online strategy, a heterogeneous wireless infrastructure is proposed by integrating cellular networks with vehicular ad hoc networks (VANETs). Challenging issues are discussed in terms of modeling PEV mobility, network selection for real-time information delivery, and modeling business revenues for charging/discharging.

Radio access networks empowered by cloud services (C-RAN) is a new design paradigm that is drawing the attention of many researchers today to tackle the growing complexity of provisioning broadband wireless services. In the next article, "Hailing Cloud Empowered Radio Access Networks," co-authored by Khalim Amjad Meerja *et al.*, the authors address the issues of C-RAN, including mobile cloud computing to leverage the concept of cloud empowered radio access networks for future 5G wireless communication networks. The authors propose a C-RAN architecture. In particular, they discuss the issues in cognitive-radio-based interference mitigation strategy and provide a media access control protocol for the proposed framework that uses this overlay interference mitigation strategy.

The next article is written by Tao Han and Nirwan Ansari, and is called "RADIATE: Radio over Fiber as an Antenna Extender for High-Speed Train Communications." In this article, the authors propose a solution for provisioning broadband Internet services in high-speed trains, named Radio-over-Fiber as Antenna Extender (RADIATE) for high-speed train communications. RADIATE utilizes cellular networks as backhauls to avoid expensive capital expenditure in provisioning broadband Internet services in high-speed trains. Applying radio-over-fiber technique, RADIATE deploys on-roof antennas and optimally operates these antennas to address the drawbacks of utilizing cellular networks as backhauls. It is shown that RADIATE provides a cost-effective and high-quality communications solution for provisioning broadband Internet services in high-speed trains.

The last article in this section is authored by Daojing He *et al.*, and is called "Mobile Application Security: Malware Threats and Defenses," It is a well-known fact that one of the most attractive features of smartphones is the availability of a large number of apps for users to download and install. It also means hackers can easily diffuse malware to smartphones for launching various attacks. This issue should be addressed by both preventive approaches and effective detection techniques. This article discusses why smartphones are vulnerable to security attacks. Then it presents malicious behaviors and threats of malware. Next, it reviews the existing malware prevention and detection techniques. It is argued that efforts are required from app store administrators, app developers, researchers, and users to defend against such malware.

BIOGRAPHY

HSIAO-HWA CHEN [S'89, M'91, SM'00, F'10] (hshwchen@ieee.org) is currently a Distinguished Professor in the Department of Engineering Science, National Cheng Kung University, Taiwan. He obtained his B.Sc. and M.Sc. degrees from Zhejiang University, China, and a Ph.D. degree from the University of Oulu, Finland, in 1982, 1985, and 1991, respectively. From 2001 to 2003, he served as the founding director of the Institute of Communications Engineering of National Sun Yat-Sen University, Taiwan, which was the first telecommunication research institute established in southern Taiwan. This institute has graduated a large number of telecommunication postgraduate degree holders for Taiwan. He has authored or co-authored over 300 technical papers in major international journals and conferences, six books, and more than 10 book chapters in the areas of telecommunications, including the books *Next Generation Wireless Systems and Networks* and *The Next Generation CDMA Technologies* (Wiley, 2005 and 2007). He has been an active volunteer for various IEEE technical activities for over 22 years. He has served as General Chair, TPC Chair, and Symposium Chair for many international conferences. He has served or is serving as an Editor or/and Guest Editor for numerous major technical journals. He served as Chair of the IEEE ComSoc Communications and Information Security Technical Committee from 2010 to 2012, and as Chair of the IEEE ComSoc Radio Communications Committee from 2007 to 2008. He was the recipient of the best paper award at IEEE WCNC 2008 and of the 2008 IEEE Radio Communications Committee Outstanding Service Award. He is an elected Member-at-Large of IEEE Communications Society. He is a Fellow of IET and BCS.