Special Issue on Recent Advance on Wireless Networks

Guest Editorial

Wireless networks technologies had already facilitated people's daily life for more than 50 years. But, still, many new emerging applications, e.g., games, multimedia content disseminations, are motivating the further development in various areas of wireless networks. It is our great pleasure to bring you this special issue of Journal of Communications on "Recent Advance on Wireless Networks", which aims at presenting innovative and significant research on the design, implementation, usage, and evaluation of wireless networks, applications, and novel techniques.

We are deeply grateful of receiving many excellent submissions to this special issue. The reviewing and revision process for all papers was rigorous and thorough. The accepted papers fall into various areas of wireless networks design. In the following, we briefly summarize the papers included in this special issue.

The increasing number of embedded devices in the vision of the Internet of Things enables the existing Web with smart things. Conventional web services are enriched to a new way to narrow the gap between the virtual world and the physical world. In the first paper, "The Web of Things: A Survey" by Deze Zeng, Guo Song, Zixue Cheng, the architecture and a number of key enabling technologies of Web of Things are elaborated. The authors further provide illustration for a number of pioneer open platforms and prototypes, and summarize the most recent research achievements. Some systematic comparisons are also provided to highlight the insight in the evolution and future of Web of Things. A number of open challenging issues are also discussed that shall be faced and tackled by research community.

Limited energy supply in wireless sensor networks causes the biggest constraint for sensor networks applications. In the second paper, "Power Saving and Energy Optimization Techniques for Wireless Sensor Neworks" by Sandra Sendra, Jaime Lloret, Miguel García, José F. Toledo, the authors present a survey of power saving and energy consumption optimization techniques for wireless sensor networks. This survey focuses on introducing the most well known available methods to readers, and mainly analyzes these methods based on four points of view: Device hardware, transmission, MAC protocols and routing protocols.

In the third paper, "Secure Localization in Wireless Sensor Networks: A Survey" by Jinfang Jiang, Guangjie Han, Chuan Zhu, Yuhui Dong, Na Zhang, sensor nodes localization in wireless sensor networks is studied from the viewpoint of security. The paper shows how the localization process can be attacked in a number of ways, and what kinds of methods can be used to solve the security problem. The known attacks in secure localization are classified into two categories: 1) attacks on nodes and 2) attacks on information. Based on these two kinds of attacks, the secure localization schemes are discussed and reclassified into two categories: 1) secure node authentication (SNA) and secure information verification (SIV). Finally, the paper presents the open research problems of secure localization in WSNs.

The fourth paper, "A Real-time Two-way Authentication Method Based on Instantaneous Channel State Information for Wireless Communication Systems" by Xiangyu Lu, Yuyan Zhang, Yuexing Peng, Hui Zhao, Wenbo Wang, presents a simple but effective method to authenticate the legitimate transmitter in physical layer by use of channel state information (CSI). The proposed method is based on three features of the channels: 1) privacy can differentiate transmitter; 2) randomness can enhance the security by changing the authentication code on time with the change of the CSI; and 3) continuous changes on time- and frequency-domain can be used to predict the CSI reliably within channel's coherent time and bandwidth. With the widely applied pilot-aided channel estimation method and the simple channel prediction algorithm, the proposed method determines whether the current message is sent by the same transmitter by comparing the estimated CSI of the current message with the predicted CSI of the previous message, and the hypothesis testing and mutual information measure are used for authentication determination. By implementing the proposed method at both ends of the communication pair, the two-way real-time per-message authentication is achieved for wireless communication systems.

It is the truth that many regions of the world do not have access to the Internet due to lack of proper communication infrastructure, especially in the developing countries. In the fifth paper, "Delay Tolerant Network on Android Phones: Implementation Issues and Performance Measurements" by Rerngvit Yanggratoke, Abdullah Azfar, María José Peroza Marval, Sharjeel Ahmed, the authors consider the Delay Tolerant Network (DTN) as a promising solution to solve the problem of lack of connectivity for communications. The authors make the android phones to be DTN capable and carry messages with a DTN boundless. The implementation of DTN on Android phone is described in this paper, and performance measurements including DTN bandwidth and battery consumption are also given.

The study of security protocols, especially their performance, in WLAN is considered as an important research problem. The sixth paper, "A New Evaluation Model for Security Protocols" by Chao Yang, Jianfeng Ma, mainly proposes a novel security protocol simulation architecture and a simulation extending method for simulating security protocols of WLAN. The authors then set up a simulation platform for modeling security protocols based on OPNET. By having simulation on the platform, the authors demonstrate the feasibility and correctness of this new evaluation model.

The seventh paper, "On-Demand QoS Multicast Routing for Triple-Layered LEO/HEO/GEO Satellite IP Networks"

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by Zhizhong Yin, Long Zhang, Xianwei Zhou, introduces a novel triple-layered satellite network architecture including 1) the Geostationary Earth Orbit (GEO), 2) the Highly Elliptical Orbit (HEO), and 3) the Low Earth Orbit (LEO) satellite layers, which provides the near-global coverage with 24 hour uninterrupted over the areas varying from 75° S to 90° N. Based on this network architecture, the authors propose an on-demand QoS multicast routing protocol for satellite IP networks. Simulation results demonstrate the enhancement of the proposed new protocol compared with conventional non-QoS shortest path tree strategy.

We would like to express our sincere gratitude to the reviewers who provided highly constructive feedbacks. We also thank the staff at the JCM Academy Publisher for their efficient job in handling the manuscripts. Last but not the least, we would extend our sincere appreciation to the Editor-in-Chief of the Journal of Communications, Dr. Haohong Wang, for providing this opportunity and facilitating preparation of an excellent journal special issue.

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