Wireless Pers Commun (2014) 78:1827–1831
DOI 10.1007/s11277-014-2046-y

Foreword by Guest Editors for the Special Issue on the 2013 ICUFN Conference

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Published online: 2 October 2014

Welcome to this special issue of Wireless Personal Communications. This special issue constitutes a selection of best papers from the 2013 International Conference on Ubiquitous and Future Networks (ICUFN). All of the papers have been extended and reviewed again by three independent reviewers. ICUFN is an annual international conference (www.icufn.org) co-sponsored by IEEE Communications Society and organized by the KICS (Korean Institute of Communications and Information Sciences).

The first paper entitled "mDFA: A Memory Efficient DFA-based Pattern Matching Engine on FPGA" studies the pattern matching architecture. The increase of the pattern set in size and complexity as well as the high demand for scanning data volume make the pattern matching task of the general purpose processor more challenging. In this paper, a memory-efficient FPGA-based pattern matching architecture is proposed to offload the time-consuming task. The prototype could achieve 2.7–3.2x speed up to software-based matching engine.

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The second paper entitled "Wireless Sensor Networks in IPv4/IPv6 Transition Scenarios" proposes a solution based on REST web services to permit the interaction between a mobile application and the IPv6 compliant WSN. The transition mechanisms and the REST Web services are supported in the gateway in order to save the wireless sensor device resources.

The third paper entitled "Exploiting User Movement Direction and Hidden Access Point for Smartphone Localization" proposes a GPS-less localization method, called Hidden Access Point Estimation-based Localization or HAPEL to pinpoint user's current position in an underground or indoor environment, especially where APs are placed scarcely in that two or less Wi-Fi access points are within the scanning range. It is shown that HAPEL improves the accuracy of the weighted centroid localization significantly.

The fourth paper entitled "Cooperative Spectrum Sensing with Adaptive Node Selection for Cognitive Radio Networks" proposes a selection probability based cooperative spectrum sensing scheme that exploits historical observations to exclude nodes receiving low-strength primary signals. Simulation results demonstrate that the proposed scheme can exploit location advantages and show almost the same detection performance as cooperative spectrum sensing with accurate node selection.

The fifth paper entitled "Optimal Sensing Interval Considering Per-Primary Transmission Protection in Cognitive Radio Networks" studies the protection of primary users in cognitive radio networks. The probability of detection and the interference ratio (probability of collision) have been considered as the main constraints for primary protection. It suggests that the busy period impaired more than a certain ratio of so-called required per-transmission interference ratio (PTIR) is subject to the primary transmission failure (PTF). The probability of PTF is derived as a function of sensing interval given the required PTIR. Then, given the required PTIR and probability of PTF, the optimal sensing interval that maximizes the throughput for secondary users is derived. Performance evaluation shows that primary users can be more protected with the optimal sensing interval obtained by using the proposed constraint.

The sixth paper entitled "Congestion Aware Geographic Routing Protocol for Wireless Ad Hoc and Sensor Networks" proposes a congestion aware forwarder selection (CAFS) method for a geographic routing protocol. To design CAFS, a cost function is derived by combining not only the forward progress made to a packet but also the amount of energy required for packet forwarding, forwarding direction, and congestion levels of potential forwarders. The simulation results show that CAFS is superior to existing methods in terms of the energy consumption, end-to-end packet transfer delay, and the successful packet delivery rate.

The seventh paper entitled "Energy Efficient and Reliable ARQ Scheme (E2R-ACK) for Mission Critical M2M/IoT Services" studies a more efficient data delivering scheme that minimizes both the transmission delay and energy consumption. The proposed scheme has three aspects of advantages compared to the legacy ARQ schemes such as ACK, NACK and implicit-ACK (I-ACK). The simulation results show that the E2R-ACK scheme achieves high RCR by significantly reducing transmission delay and energy consumption.

The eighth paper entitled "SINR-Constrained Joint Scheduling and Optimal Resource Allocation in VLC based WPAN System" proposes a novel joint scheduling and rate allocation (JSRA) algorithm associated with throughput maximization and channel-state in VLC scenario. In the JSRA model, each channel can determine the feasibility of its rate which always intends to increase by exploiting the constraint value of signal-to-interference-plus-noise ratio (SINR) of that scheduled channel. The results show that the performance of the joint control approach increases the total system average throughput and the spectral efficiency.

The ninth paper entitled "AP-Initiated Reservations for Performance Enhancement in 802.11 MAC" proposes an AP-initiated reservation scheme aiming at resolving the unfairness problem and enhancing the network performance. The proposed scheme gives a high priority for AP's channel accessing and allows AP to transmit multiple frames at once. Both the analytical and simulation results show that proposed scheme significantly enhances the performance of 802.11 MAC.

The tenth paper entitled "Orchestration in Distributed Web-of-Objects for Creation of User-centered IoT Service Capability" has defined Semantic Ontology models representing Device, Resource and Service that enable objects to interconnect. The combination of physical devices and resources would form Virtual Object based on the classified Device and Resource model. The Composite Virtual Object is formed with the combination of Virtual Objects and the physical location and neutral things defined as Non-ICT entities into the virtual world to provide more detailed information and services.

The eleventh paper entitled "On the Capacity of Secondary Networks over Opportunistic Spectrum Access in Rayleigh Fading Channels" studies the effect of the opportunistic spectrum access on the spectrum utilization in terms of the secondary network capacity measured at the secondary receiver. A mathematical model is developed to represent the secondary network capacity in Rayleigh fading channel. An exact analytical solution for the capacity is derived for both sensing and accessing fading channels. The analytical results that are validated by substantial simulations showed how the utilization of the network can be increased significantly by the suggested opportunistic spectrum accessing technique.

The twelfth paper entitled "Safe Path Planning Strategy for Bike Net" proposes an innovative and practical safe path planning strategy which addresses the issue with the concept of safety factors and a safety recurrence relation. A dynamic programming solution is provided accordingly. The idea is illustrated using real site data to demonstrate the result of the strategy.

The thirteenth paper entitled "HIMALIS-VI: Fast and Secure Mobility Management Scheme based on HIMALIS for V2I Services in Future Networks" proposes a novel mobility management scheme, called HIMALIS-VI to integrate V2I communication with an ID/locator split approach based on the HIMALIS architecture. The proposed scheme can contribute to a delay reduction for the authentication and mitigating handover procedures at both the mobile hosts and network entities in an edge network.

The final one entitled "Performance Analysis and Optimization of MAC Frame Size in IEEE802.15.7" studies the optimization issue in visible personal area network. In the IEEE 802.15.7 standard, the contention problem is solved using random access mechanism, and the performance of the star topology VPAN system is greatly affected by the configuration of MAC sublayer, especially the superframe size. Through simulations, the impact of the superframe size on the network performance in terms of network throughput and delay is analyzed. In consideration of trade-off between throughput and delay, the optimum value of superframe size is derived.

We would like to thank the Editor-in-chief (Professor Ramjee Prasad) and Springer's senior editorial assistant (Gabriella Anderson) for their support and help in realizing this special issue. We also would like to say special thanks to all the authors for promptly revising their papers according to the requirements of the viewers. Special thanks are extended to the organizers of the ICUFN conference, especially to the Organizing Co-Chair (Professor Yeong Min Jang) and TPC Co-Chair (Professor Myungsik Yoo) for gathering high quality papers for this special issue. I hope you will enjoy reading this special issue.

Seong-Ho Jeong received his Ph.D. degree in Electrical and Computer Engineering from Georgia Institute of Technology, Atlanta, USA. He worked for Electronics and Telecommunications Research Institute (ETRI) as Senior Member of Research Staff from 1990 to 2001. He is currently Professor of Department of Information and Communications Engineering at Hankuk University of Foreign Studies and has led various industry projects as Principal Investigator in the areas of multimedia communications and applications, wireless/mobile networks, future networks, QoS/QoE, home networks, cross-layer design, networked robot, mobility management, signaling, CCN/CDN, and others. He has been serving as Vice-Chairman of ITU-T SG16 and Chairman of ITU-T SG16 WP2 (Multimedia Applications and Systems) since 2009. He has also been serving as Editor of various Recommendations on multimedia systems and QoS/QoE in ITU-T SG16 and ITU-T SG13 since 2002. In addition, he has contributed to standardization in other standards developing organizations including IETF and 3GPP. He is Vice-President of The Korean Institute of Information Scientists and Engineers and Executive Director of Korea Information and Communications Society. He has consulted for many companies including ETRI and Samsung Electronics. He served as Technical Program Committee Chair of various international conferences including ICUFN 2011, ICOIN 2012, ICTC 2013, and ICTC 2014. He also served as TPC member of numerous international conferences. He has many journal/conference publications, patents, and standards in the areas of communication, multimedia systems, and networking technologies.

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