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Editorial

Intelligent Systems for Future Generation Wireless Networks

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The ever-growing future generation wireless networks (FGWNs) provide an intelligent and ubiquitous communication and network technology for tomorrow. That is, the FGWNs have emerged rapidly as an exciting new paradigm that includes ubiquitous, grid, and peer-to-peer computing to provide computing and communication services at any time and anywhere. In order to realize the advantages of such services, it is important that intelligent systems be suitable for FGWN. This special issue aims to foster the dissemination of high-quality research in any new FGWN idea, method, theory, technique, or research. The objective of this special issue is to showcase the most recent developments and research in the FGWN field, as well as to enhance its state of the art. Original and research articles are solicited in all aspects of FGWN including new communication technology, theoretical studies, practical applications, and experimental prototypes for FGWN.

The first paper of R. P. Karrer et al. presents an overview of the current status of mesh networks deployment and highlights the technical, economical, and social challenges that need to be addressed in the next years. As proof of principle study, they discuss the above-mentioned challenges with reference to three real networks: (i) MagNets, an operator-driven planned two-tier mesh network; (ii) Berlin Freifunk network as a pure community-driven, single-tier network; (iii) Weimar Freifunk network, also a community-driven but two-tier network.

The next paper by K. Sethom et al. proposes a QoS aware mesh protocol for future home networks using autonomic architecture. They investigate the key concept of adding a knowledge plane to enable the automated control and management of home resources taking into account wireless mesh topology basis. This new supplementary plane helps to make an intelligent decision to select network paths that have sufficient resources to satisfy the QoS requirements of the admitted connections.

In the third paper, X. Chen et al. propose an efficient relaying scheme, referred to as broadcast reserved opportunity to achieve diversity (BROAD) for the relay-enhanced cellular networks. The proposed scheme acquires channel quality information in which the destined node sends pilots on a reserved radio resource. The BROAD scheme can significantly decrease the signalling overhead among the mobile relaying nodes while achieving the same multiuser diversity as the conventional induced multiuser diversity relaying scheme.

The next paper by Y.-M. Chen et al. presents a novel motion-aware scheme called network discovery with motion detection (NDMD) to improve handoff quality and minimize power consumption. The NDMD first applies a moving average convergence divergence (MACD) scheme to analyze received signal strength (RSS) samples of the current active interface. These results are then used to estimate user's motion. The proposed NDMD scheme adds very little computing overhead to a mobile terminal and can be easily incorporated into existing schemes.

In the next paper, F. YIN et al. analyze and develop a mathematical model to evaluate the performance of the contention-based and delay-tolerant applications in IEEE 802.16 networks. They focus their attentions on allocating the uplink bandwidth efficiently; the basic goal is to optimize the performance with an optimal bandwidth allocation mechanism.

In the next paper, J.-H. Wen et al. work around potentially computational intractability. The proposed particle swarm optimization scheme exploits heuristics to search the optimal combination of phase factors with low complexity. Simulation results show that the new technique can effectively reduce the computation complexity and the peak-to-average power ratio reduction.

In the next paper, C.-H. Hsu et al. propose layered elimination optimization (LEO) which is an algorithm-independent technique aiming to detect maximum amount of redundant readers that could be safely removed or turned off with preserving original RFID network coverage. The proposed technique can provide reliable performance by detecting higher redundancy and has lower algorithm overheads.

The next paper by W.-E. Chen et al. describes six solutions including Static Route, UPnP, STUN, ICE, ALG, and SBC. They compare these solutions in terms of smart home appliance modification, scope of network address translators supported, multilayer NAT traversal, ease of configuration, security issue, and time complexities.

In the next paper, C.-L. Chen et al. propose a dynamic key management protocol, which can improve the security of the key juxtaposed to existing methods. Additionally the dynamic update of the key can lower the probability of the key to being guessed correctly. In addition, with the new protocol, attacks on the wireless sensor network can be avoided.

The next paper by J. Kwak et al. presents the channel estimation and frequency offset estimation scheme for future generation OFDM-based intelligent packet communication systems. They allocate intelligently different powers to the short- and long-training symbols while maintaining average power of overall preamble sequence. The proposed schemes can be used in designing for enhancing the performance of OFDM-based future generation intelligent communication network systems.

In the next paper, S. Hur et al. propose an elegant addressing scheme and its routing algorithm. While maintaining the existing address scheme, it tackles the wastage problem and achieves no additional memory storage during a routing. They present an adaptive routing algorithm for location-aware applications, using our addressing scheme.

In the next paper, M. Kassar et al. propose an intelligent solution answering user requirements and ensuring service continuity. They focus on a vertical handover decision strategy based on the context awareness concept. The given strategy chooses the appropriate time and the most suitable access network among those available to perform a handover. It uses advanced decision algorithms and it is governed by handover policies as decision rules.

The next paper by V. Friderikos et al. describes a low-complexity iterative pruning-based routing scheme that utilizes scheduling information to construct the spanning tree. A randomized version of this scheme is also discussed and numerical investigations reveal that the proposed iterative pruning algorithms outperform previously proposed routing schemes that aim to minimize the transmitted power or interference produced in the network without explicitly taking into account scheduling decisions.

The next paper by C. Sun et al. proposes a novel content-based distortion control scheme. The proposed scheme provides higher quality of the wireless video services and adopts rate-distortion optimization techniques in state-of-the-art video coding standard H.264/AVC. In order to improve the subjective video quality in the process of encode, they create three visual distortion sensitivity models to minimize the perceptual distortion.

Finally, in the last paper by W.-F. Yang et al., relying on a simple flag-assisted mechanism, a multigroup priority queuing (MGPQ) medium access control (MAC) protocol is proposed for the wireless networks with multipacket reception (MPR). The proposed MGPQ scheme is capable of overcoming two major performance bottlenecks inherent in the existing MPR MAC protocols.

We wish to thank all the authors for their great work and for considering the EURASIP Journal on Wireless Communications and Networking (JWCN) for submitting their papers. Special thanks go to the anonymous reviewers for their help and dedication in reviewing the papers and providing useful comments to the authors for their papers improvement. Special thanks to the EiC, Luc Vandendorpe for hosting this special issue in the JWCN journal, and for their excellent support.

We hope that this special issue will represent a timely and significant reference for future researches.

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