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Editorial

Cooperative Communications for Wireless Ad Hoc and Sensor Networks

Yong Sun,[1] Shukui Zhang,[1] Hongli Xu,[2] and Shan Lin[3]

[1] *Computer Science and Technology Institute, Soochow University, Suzhou, Jiangsu 215006, China*
[2] *School of Computer Science and Technology, University of Science and Technology of China, Hefei, Anhui 230022, China*
[3] *Department of Computer and Information Sciences, Temple University, 324 Wachman Hall, 1805 N. Broad Street, Philadelphia, PA, USA*

Correspondence should be addressed to Yong Sun; suny@suda.edu.cn

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The concept of cooperative communications for wireless ad hoc and sensor networks (WAHSNs) has recently attracted considerable attention. Different users or nodes in a WAHSN share resources to create collaboration through distributed transmission, which can significantly improve the performance of WANSNs. Thus, the problem that how relay nodes in the network cooperate with each other is the main subject in this special issue. The authors have focused on relay cooperation models based on the network coding, spectrum allocation, and models with space-time code, and so forth.

The paper "*An efficient reliable communication scheme in wireless sensor networks using linear network coding*," by J. Wang et al., addresses the modeling and design of linear network coding (LNC) for reliable communication against multiple failures in wireless sensor networks (WSNs). The proposed deterministic LNC scheme RDLC can significantly improve the network throughput. The authors also investigate the potential of random linear code RRLC for providing reliable communication in WSNs.

In the paper "*Network coded wireless cooperative multicast with minimum transmission cost*" by X. Wang et al., the authors explore the problem of minimum cost wireless cooperative multicast by using network coding. The authors propose a network coded hybrid source and cooperative exchange scheme to determine when to stop the source sending and start the exchange process, so as to minimize the total transmission cost.

The paper "*Cooperative transmission in cognitive radio ad hoc networks*," by J. Jia S. Zhang, investigates a cooperative transmission scheme to address the spectrum heterogeneity issue in cognitive radio ad hoc networks (CRAHNs) to improve the efficiency of spectrum utilization and the performance of cognitive radio networks. In particular, the authors describe several types of cooperative transmission and formulate a new resource allocation problem with joint relay selection and channel allocation.

The paper "*Towards aid by generate and solve methodology: application in the problem of coverage and connectivity in wireless sensor networks*," by P. R. Pinheiro et al., investigates the novel Generate and Solve (GS) methodology to solve the problem of coverage and connectivity in wireless sensor networks.

The paper "*Low-complexity decoding algorithms for distributed space-time coded regenerative relay systems*," by C. Zhang H. Yin, examines decoding structure for distributed space-time coded regenerative relay networks. Given the possible demodulation error at the regenerative relays, the authors provide a general framework of error aware decoder, where the receiver exploits the demodulation error probability of relays to improve the system performance. The authors also propose two low-complexity decoders.

The paper "*Integrated extensible simulation platform for vehicular sensor networks in smart cities*," by X. Tang et al., presents an integrated extensible simulation platform BHU-VSim for vehicular sensor networks (VSNs), which aims to support general simulation environment for typical vehicular applications in smart cities. And, as an initiate attempt, their platform provides significant improvement of VSNs' simulations.

The paper "*Efficient sensor localization method with classifying environmental sensor data*," by A.-c. Eun and Y.-g. Ha, proposes a novel localization method that uses environmental data recorded at each sensor location and a data classification technique to identify the location of sensor nodes.

The paper "*A path planning algorithm with a guaranteed distance cost in wireless sensor networks*," by Y. Liu et al., presents a distributed algorithm to obtain a path for the mobile node with minimum distance cost and effectively organize the network to ensure the availability of this path.

The paper "*Novel node localization algorithm based on nonlinear weighting least square for wireless sensor networks*," by F. Xiao et al., presents a new method for wireless sensor network node positioning based on nonlinear weighting least-square algorithm to explore the optimal solution and further reduce the positioning computational complexity by the simplification of the Taylor equation.

The paper "*A multiple-dimensional tree routing protocol for multisink wireless sensor networks based on ant colony optimization*," by H. Zhou et al., deals with the problem of a multiple-dimensional tree routing protocol for multisink wireless sensor networks based on ant colony optimization.

The paper "A Diagnosis-Based Clustering and Multipath Routing Protocol for Wireless Sensor Networks", by Wenjun Liu et al., proposes an energy-efficient data collection protocol which consists of clustering and multipath routing for fault diagnosis to ensure the gathering information accuracy and reduce energy additionally consumed by faulty nodes.

The paper "On guaranteed detectability for surveillance sensor networks," by Y. Zhu, proposes a fully distributed algorithm GAP for energy-efficient event detection for surveillance applications.

The paper "*ARQ protocols for two-way wireless relay systems: design and performance analysis*," by Z. Chen et al., proposes three basic automatic repeat-request (ARQ) protocols to improve the throughput of two-way relay systems, namely, relay-only ARQ (Ro-ARQ), terminal only ARQ (To-ARQ) and relay-terminal ARQ (RT-ARQ).

In the paper "*Distributed routing and spectrum allocation algorithm with cooperation in cognitive wireless mesh networks*," by Z. Chen et al., a distributed routing and spectrum allocation algorithm with cooperation (DRSAC-W) in cognitive wireless mesh networks is proposed, against the routing and spectrum allocation challenge in cognitive wireless mesh networks.

The paper "*NUNS: A nonuniform network split method for data-centric storage sensor networks*," by K.-Y. Lee et al., proposes a nonuniform network split(NUNS) method that distributes the load among sensor nodes in data-centric storage sensor networks and efficiently reduces the communication cost of expanding sensor networks.

The paper "*An efficient clustering algorithm in wireless sensor networks using cooperative communication*," by S. Zhang et al., constructs a minimum weakly connected dominating set (WCDS) as a clustering scheme for WSN.

The paper "*A hole-tolerant redundancy scheme for wireless sensor networks*," by J. Pu et al., introduces a new hole-tolerant redundancy scheme (HRS) which can prolong network lifetime while maintaining coverage and connectivity performance.

The paper "*CAC-MAC: a cross-layer adaptive cooperative MAC for wireless ad hoc networks*," by C. Shi et al., proposes a cross-layer adaptive data transmission algorithm considering both the length of data frame at the MAC layer and instantaneous wireless channel conditions. Under this algorithm, direct transmission mode or proper cooperative transmission mode will be adaptively selected for data packets according to both MAC layer and physical layer information.

The paper "*A mobile agent routing algorithm in dual-channel wireless sensor network*," by K. Liu et al., a mobile agent routing algorithm (MARA) is presented, and then based on the dual-channel communication model, the two-layer network combination optimization strategy is also proposed to make the energy of each nodes on the optimal route overall decline and hence improve the lifetime of network.

Yong Sun
Shukui Zhang
Hongli Xu
Shan Lin