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Editorial

Mobile Wireless Sensor Networks: Theory and Technologies

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Mobile wireless sensor networks have been proposed for use in many challenging applications, such as military surveillance, scientific exploration, and structural monitoring. Sustainable deployment of these systems calls for effective theory and designs. This special issue solicits high-quality original research papers. The result is a collection of nine articles in aspect of nodes design, localization scheme, routing, and channel estimation for wireless sensor networks.

Y.-S. Park et al. propose a new sensor node, called Smart One-Channel Sensor Node (SOSN), which can practically solve the issues on installation, time synchronization, and data storage. It was designed for temporal measurement with a limited capacity to operate for several hours using embedded batteries.

K. Khaoampai et al. propose a floor localization system. The proposed system does not need any site survey and any support from back-end server. It has a self-learning algorithm for creating fingerprint in each floor. The self-learning algorithm utilizes sensors on the mobile phone for detecting trace of mobile phone user. This algorithm has low computation complexity, which can be operated on any mobile phones.

M. Arellano-Vázquez et al. introduce a consensus routing algorithm based on an availability function. Such a function obtains a consensus among a group of nodes by evaluating the idle time in the scheduler of each node, along with the general conditions of the network and determining the next step of the route.

B.-H. Liu et al. study the problem of constructing virtual backbones in dual-radio wireless sensor networks to maximize the network lifetime, called the Maximum Lifetime Backbone Scheduling for Dual-Radio Wireless Sensor Network problem, where each sensor is equipped with two radio interfaces.

S. Li et al. solve the intercoil crosstalk in magnetic-induction multiple-input multiple-output (MIMO) communication and investigate the channel capacity for underground wireless communication. Simulation shows that the channel capacity would increase significantly in high SNR regime for underground communication.

H. Liao and S. Ding propose a trust-based scheme for identifying and isolating malicious nodes. A mixed strategy and a continuous strategy monitor-forward game between the sender and its one-hop neighboring node are constructed to mitigate the selective dropping attacks in WSN.

H. Jiang et al. propose the energy optimized and fault recovered routing algorithm on account of different network states. Simulation results show that the algorithm has effectively extended the network lifetime and achieved optimized combination of energy efficiency and energy balance.

Z. Ding et al. design a novel distributed online anomaly detection method in resource-constrained WSNs. In this new algorithm, exploiting the spatiotemporal correlation existing in the sensed data collected from WSNs, a series of single anomaly detectors are built. The experiments operated on a real dataset demonstrate the effectiveness of the proposed method.

H. Wang et al. propose a cooperative automatic retransmission request protocol based on two-relay-node selection. The numerical results reveal that its throughput and energy efficiency could perform better when compared with the traditional ARQ protocol.

Uniformly, these authors highlight both the promise and the challenges faced by this emerging field of mobile wireless sensor networks. The accepted papers present the most up-to-date progress in theory and technologies for mobile wireless sensor networks. Hopefully, this publication will trigger more discussions and new research directions in mobile wireless sensor networks area.

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